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FEBRUARY, 1957
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WI BROADCASTS

All Amateurs are urged to keep these frequencies clear during, and for a period of 15 minutes after, the official Broadcasts.

VK2WI: Sundays, 1100 hours EST, 7146 Kc. and 2000 hours EST 56 and 144 Mc. No frequency checks available from VK2WI. Intrastate working frequency, 7135 Kc.

VK3WI: Sundays, 1130 hours EST, simultaneously on 3573 and 7146 Kc., 57.5 and 146.25 Mc. Intrastate working frequency 7135 Kc. Individual frequency checks of Amateur Stations given when VK3WI is on the air.

VK4WI: Sundays, 0900 hours EST, simultaneously on 3580 and 14342 Kc. 3560 Kc. channel is used from 0915 hours to 1015 hours each Sunday for the W.I.A. Country hook-up. No frequency checks available.

VK5WI: Sundays, 1000 hours SAST, on 7146 Kc. Frequency checks are given by VK5MD and VK5WI by arrangements on all bands to 56 Mc.

VK6WI: Sundays, 0930 hours WAST, on 7146 Kc. No frequency checks available.

VK7WI: Sundays, at 1000 hours EST, on 7146 Kc. and 3672 Kc. No frequency checks are available.

VK9WI: Sundays, 1000 hours EST, simultaneously on 3.5, 7, 14 and 144 Mc. Individual frequency checks of Amateur Stations given when VK9WI is on the air.

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EDITORIAL

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NEW TECHNIQUES FOR EMERGENCIES

At the commencement of a New Year it is usual to make resolutions for the ensuing twelve months. This year should be no exception. Now that the Olympics are concluded and Christmas dispensed with, it is time to think once more of our hobby and its impact on our lives over the coming year.

A recent conference in Melbourne dealing with Civil Defence and communication networks pertaining to it bring to mind a very appropriate subject for serious consideration. How many of us have thought about the future of emergency communications? Not too many, I would wager. The days of the dynamotor, portable generator set and electric power line are numbered when one seriously considers the impact (literally) of an atomic bomb on a city such as Melbourne or Sydney. As all our present electronic and radio communication devices are based on a supply of electric power we must look for something more readily available and less vulnerable than batteries and less cumbersome than genemotors. Where then is our source of electric power to be obtained? One of the only answers is that eternal source of energy—the sun.

New techniques have shown that therein lies a solution, for solar cells of miniature proportions paralleled together have already been used with good results to power transistor transmitters and receivers. The pipe-dream of being able to carry both your receiver and transmitter in your pocket is now almost reality. A miniature super-het communications receiver fully transistorised has already been built and proven, and many varieties of single and dual stage transistor transmitters have also been air-tested with remarkably good results. Although all of the necessary transistors and small components are not yet available on the Australian market, you can rest assured that this position will soon be rectified by the enterprising radio dealers throughout the country.

For those that are particularly interested in the miniaturised emergency equipment and for those with a yen to experiment, herein lies an ideal opportunity to exploit your ingenuity, at the same time making a really worthwhile contribution to a phase of our activities which will pay dividends should such a fateful emergency ever arise.

This aspect of the art should therefore be your goal for 1957—to experiment in the new art of transistorisation, contribute articles to your magazine on this enthralling subject, discuss production of miniature components with your radio dealer and last, but not least, "pass the good word" along by example and demonstration on the air. The reward for your endeavours will be the ultimate satisfaction of the public in general and your fellow Amateur in particular, knowing that the Radio Amateur is a pioneer who will always be the first to explore new techniques and employ them for the public good.

FEDERAL EXECUTIVE.

[An article by VK3AHH on a Miniature Transistorised Transmitter will appear in the next issue. Further articles of this nature would be welcome from readers.—Editor]

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Can We Tune a Beam Correctly Near the Ground?

BY H. F. RUCKERT,* VK2AOU

EVERY Ham who has owned a beam and compared its performance with that of other antennae will wish for beams on all bands. It takes time and effort to build a tower or to erect a pole and to mount the bits and pieces for a beam. Only too often we find that we have no energy left after getting the beam in place. Most of us are not experienced in climbing and we seem to find that the distance from the beam to the ground is at least three times the actual height, if we dare to look down at all.

Mum and the kids, and also the life insurance agent, are not very happy about our climbing project. Some people recommend the taking of an umbrella to soften the fall in case we get into trouble. The writer was probably no exception when he searched the book of books, the A.R.R.L. Antenna Book, dozens of "QSTs" and many other sources of wisdom and experience to find an easy way out and to answer the question: "Can we tune a beam correctly near the ground?"

There was no answer describing a short cut for the procedure. Beam owners I asked had usually been using the tables in the handbook and tuning the beam elements with a hacksaw, hoping for the best and that surrounding objects would not upset the handbook data.

The matching is even more of a problem, but, tired by now of construction work and pole climbing, many leave the array tuned "near enough." Doing the job this way we often don't feel too happy, having no proof of the correct "tuning up" of our beam. Many a Ham has discovered that the front-to-back ratio is by no means as good as it is in the book and the next contest delivers the hard-to-swallow pill that we still haven't the strongest DX signal in town.

Many fine beam-building descriptions in "QST" show us how, with much patience, help from nearby Amateurs (even the local fire brigade) and dozens of test series, the beam gets the final touches to ensure the calculated performance. The more work and money we have invested, the more afraid we are that the next storm may ruin it all.

In spite of this knowledge of the experience of others, I went on to build a 44 ft. pole and a three element V.P. beam, a 'la Mosley. Our house is a typical single story bungalow, so we could not use the method described by W3HTF in February, 1956, "QST," and the back yard was not big enough to lay the 44 ft. pole down, so that the pole assembly had to be done in the driveway, beside the house.

Twenty-five ft. sections of 1½" x 3" were bolted together with ½" coach bolts and the centre was twice as strong. Galvanised cloth line, as used on the masts of sailing boats, was used to support the pole. A 23 ft. double pole, resembling a ladder, was put in the ground with a concrete foundation.

As can be seen from the photograph, a ¾" pipe was used as turning axle to flop the top section of the pole over so that the installation of the beam and all adjustments could be carried out near the ground. It is a one-man job to pull the top section around 150° to the vertical position. The XYL is handy to watch that the guy wires don't get fouled up in the trees, guttering or clothes line. So far we believed that we had found a very smart method of lowering the beam for tuning, pulling it up for test, and repeating the procedure till everything was right.

I did not follow the building instructions for the first V.P. beams, as published in "QST." The element length and spacing were chosen for a 21 Mc. beam of full size. Large diameter self-supporting coils were wound and placed in the middle of each element. The beam was now placed on a step ladder in the back yard 5 ft. 6 in. above the lawn, which is 2 ft. above a very moist layer of clay. In this position the beam was only just clear of the gutter of the garage, the wires which should support the grapes next summer and other domestic installations.

Using the grid dip meter, the three elements were then tuned to the recommended V.P. beam frequencies. As the g.d.o. is mains operated (via the lawn-mower cable) thick rubber gloves were used, so as not to run the same risk as W3JSI (March, 1956, "QST"). Being engaged in the electric capacitor industry, I had a fair idea that the elements would have far less capacity to ground at 44 ft. than at 5 ft. 6 in. Calculations gave some clue, but my back yard did not provide the ideal earth required by the formula that I found in the book. Still, hoping that the detuning would not be too serious, the beam was pulled up and tested.

Local reports mentioned that the signal was better than with the 8JK, windom and dipole antennae used previously, but reports on the front-to-back ratio were not uniform and varied between 0 and 2 S units. The receiver confirmed these rather unsatisfactory results. The next week-end saw the beam back on the ladder.

An aperiodic field strength meter was put together, using a GE diode and was coupled to a receiving antenna consisting of a dipole wound in a spiral on a long broom-stick. The tuning of the elements was adjusted for best forward gain, with the field strength meter at a distance of 2 wavelengths away. The back of the beam was then turned towards the f.s.m. and lowest backward radiation was achieved by a very slight adjustment of the reflector coil spacing. The receiving dipole was then placed very close to the director and this extremely critical adjustment repeated. A check showed that the adjustment for lowest backward radiation had not affected the forward gain materially.

* 35 Berrille Road, Beverly Hills, N.S.W.

Next the coupling link on the radiator coil was adjusted for best output. Some idea of the s.w.r. could be gained with an absorption frequency meter, by walking along the feeder, lying 1" above the ground and it proved to be not too bad. Up went the beam again. The next night a G6 was worked, but other VK2s still had a 2-S-point advantage with their two element beams!

Back to the books which were saying that not only the tuning of the elements, but also the s.w.r. varies as the beam height above ground is varied. It was a half hour job to solder up a Maxwell s.w.r. bridge on a piece of bakelite. I then remembered the statement by W6IBD on page 34 of February, 1953, "QST": "The resonance frequency is always there where the s.w.r. is lowest, regardless of what the s.w.r. may be." Therefore the s.w.r. bridge was the necessary gadget to determine the actual resonance frequency of a beam in its operating location!

My s.w.r. was 1 : 7 at 14 Mc. and 1 : 1.3 at 14.5 Mc. remaining low up to 15 Mc. and then slowly rising again. On the ground the beam had been tuned to 14.15 Mc., therefore the detuning of the beam due to the changed height was about 300 to 400 Kc. in this particular case. The front-to-back ratio on the high end of the 14 Mc. band was quite good.

Next week-end down came the beam again. The v.f.o. was set near 13.8 Mc. and the beam tuned as previously described, but to a frequency 350 Kc. lower to allow for the capacity loss when mounted 44 ft. high. **Results:** The results were most satisfying and interesting. The s.w.r. was now 1 : 1.4 at 14 Mc. and never above 1 : 1.3 anywhere in the range between 14.1 to 14.35 Mc.

Most of the DX skeds are arranged near 14.330 Mc. because this section of the band is usually QRM free. 85 DX countries were worked on phone with 100 watts during only 700 QSOs during the DX conditions prevailing near the sunspot minimum in 1954-55. Many successful dog fights are recorded and quite often the report has been "the best VK signal on the band at the time" (perhaps the competition was not on the air!).

We have no hill-top location, though the soil conductivity is good. 60 ft. high two element beams of full size usually do not get better reports.

CONCLUSION

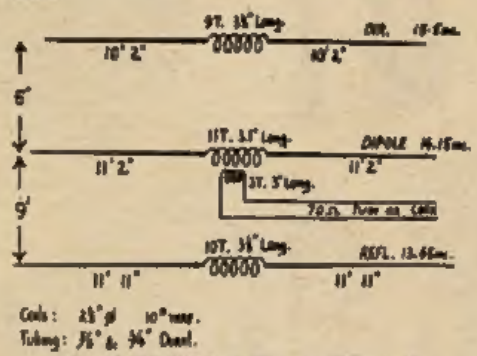
The conclusion is: Beams can be tuned correctly on the ground **if we choose a lower frequency**, which may be determined with the help of an s.w.r. bridge. Though we were rather doubtful whether the very critical adjustment of the reflector for maximum front-to-back ratio would hold, tests with the receiver and transmitter showed that 5 to 6 S points (each 6 db) were still achieved, which is very satisfactory. There are also very sharp nulls on each side.

21 AND 28 Mc. OPERATION

With 21 Mc. coming good and 28 Mc. showing signs of life more frequently, tests were made to see if this beam would work on higher frequencies as well. The s.w.r. bridge showed smaller ratios with increasing frequency, so we called CQ on 21 Mc. There was a pleasant surprise when VKs and ZLs reported that this 14 Mc. beam on 21 Mc. gave 5-7 S points gain over the 7 Mc. long-wire antenna used a few minutes before. My receiver, with its calibrated S meter, confirmed the result.

European DX partners declared that the signal is only one S point weaker than the strongest VKs on 21 Mc. at the time. The front-to-back ratio here is only two S points because the very critical adjustment cannot be expected to be correct for two bands. We are still looking for a satisfactory explanation of just why the beam is so good on 21 Mc. The element length and spacing is correct for 21 Mc. The loading coils may form a series tuned circuit between the half elements with the ground capacity combining them into a full size plumbers' delight beam. I wonder if this explanation will receive the "OK" of the experts?

Testing the beam on 28 Mc. showed that the s.w.r. is even better than on 14 and 21 Mc., but the spacing and tuning of the elements is wrong to give a good front-to-back ratio. A few contacts were made around the Pacific area, but the performance was no better than with the dipole. So we at least have a good beam on two bands without having to change anything except, of course, the tuning of the band-switching transmitter.



Short 20 Metre Three Element Close Spaced Beam.

LIGHT CONSTRUCTION

The t.v. antenna type rotator I use is not very strong and turns rather slowly when there is some breeze, the usual case when living within a few miles of the coast. In order to minimise the load, the lightest possible construction was used; this also reduces the danger of breaking the tubing elements.

The total weight of all six tubes is only three pounds and the beam, including the 1.2 x 2" x 14' long boom is only 20 lb. The beam stood up quite well to the many gales and frequent thunderstorms during two years of operation. Only once a reflector tube was bent and fell slowly the day after it was hit by a sudden blow during a thunderstorm. This was fixed by putting a slotted piece of tubing over the critical section near the outside stand-off insulator.

One photograph shows the axle was put through the 23 ft. supporting double pole and the middle of the 44 ft. main pole. The steel supporting cables, which prevent bending of the pole when the beam is flopped over, can also be seen. The other photograph gives an idea of what the beam looks like when it is up in the air. Four guy wires are fastened at the upper end of the pole and again at the top of the double pole. The pole also supports a 40 metre zepp antenna for 80 and 40 metres.

The feeder is a 70 ohm double co-ax cable in the shack and 70 ohm twin lead outside. A seven core cable comes down from the motor and direction indicator to the shack. There is a locking device underneath the boom. It is a 4 ft. long arm of 1" x 2" timber with a fork shaped iron at one end, which can be controlled from the ground to hold the beam in a given direction and to relieve the motor gears of the strong swinging load when the beam is not being used. The loading coils were not covered, as there is (usually) no snow or ice in Sydney.

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A Modulator for the QRP Rig

BY M. RILEY,* VK2ARZ

• The modulator to be described was developed by the writer for use in conjunction with low power transmitters. In particular it was found to be useful for modulating a Type A Mark III.

REFERENCE to the circuit will reveal several useful features. Three tubes are used and the heater circuit is wired so that either 6 volt or 12 volt operation is possible by completing a simple modification.

Bias for the output stage is derived from the heater network by means of a selenium rectifier. When the heaters are operated from an a.c. source the rectifier and filter circuits produce a d.c. voltage approximately equal to the peak value of the heater supply. When the equipment is operated from a d.c. source for mobile or portable operation, a "positive grounded" accumulator will produce a slightly lower bias voltage. In particular 15v. d.c. is developed from a 12.6v. r.m.s. supply. This value is quite suitable for use with a 12AU7. The optimum load applied to the unit is then about 2,500 ohms. Satisfactory results are obtained, however, when a load of 6,000 ohms is used (as in the case of the Type A Mark III.). More complete modulation may be obtained by modulating the screen of the transmitter buffer stage in addition to the plate and screen of the p.a.

If 6 volt operation is desired the 12AU7 may be replaced by a 12AX7. This stage should then be operated with about 4 volts of grid bias and the optimum load becomes nearer 5,000 ohms. A reduction in h.t. current may also be obtained.

The r.c. filter used in the bias circuit is quite adequate to eliminate hum when the heaters are a.c. operated.

* 6 Baringa Road, Mortdale Heights, N.S.W.

It should be noted that the 12AX7 has a lower plate dissipation rating than the 12AU7 and that the use of tone modulation (particularly for extended periods) may lead to damage of this tube.

Although the unit was found incapable of producing more than about 2 watts of undistorted audio when loaded with a 5,000 ohm resistor, the output is sufficient for speech use with transmitters running up to 8 watts input.

If more output is desired, the use of a better output transformer and about 25v. bias is recommended for the 12AU7.

The use of two 12AX7 tubes connected in push-pull parallel is also a possibility worth considering.

CIRCUIT

The first stage uses a 6SH7 pentode pre-amplifier. A grid stopper and plate by-pass eliminated troublesome feedback which developed when the unit was used in conjunction with a two metre transmitter.

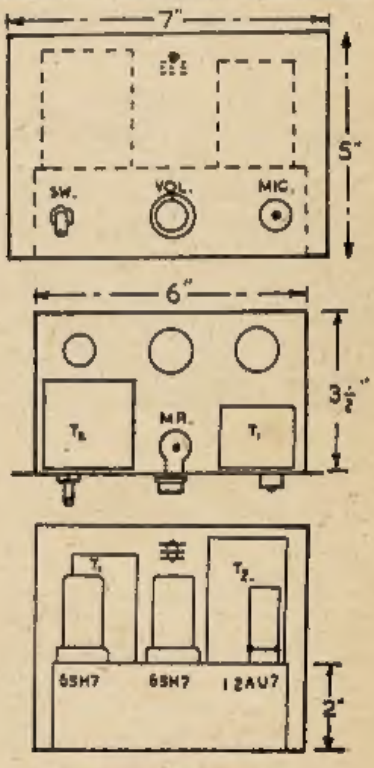
The second stage is a triode connected 6SH7 driver. Negative current feedback is introduced by the use of an unbypassed cathode resistor. The driver transformer is a junk box item marked "Stancor A4719". It should be a step-down, "single ended plate to push-pull grid" type.

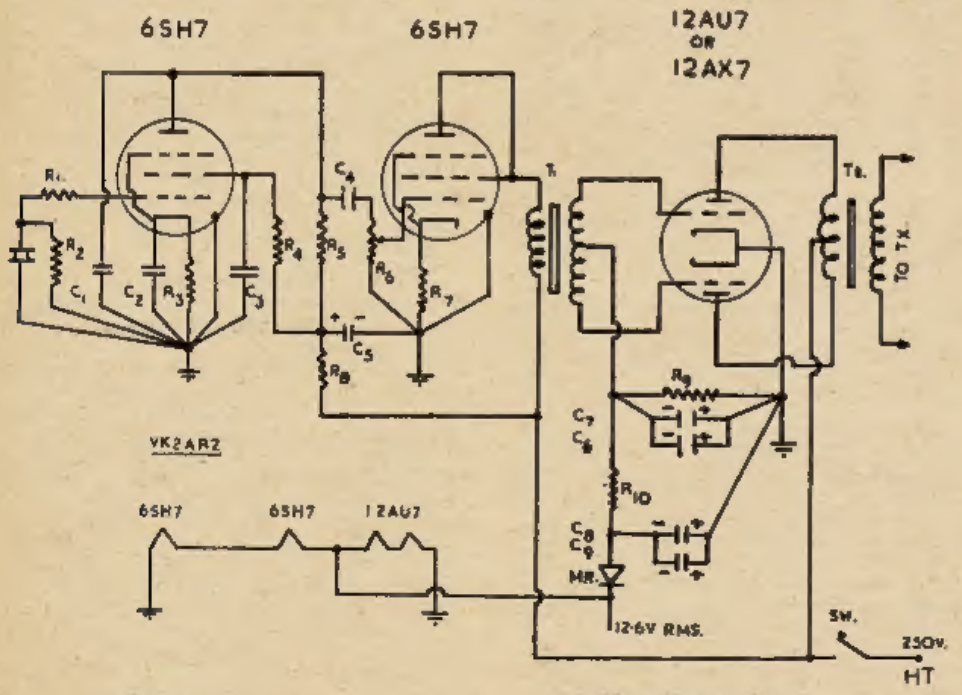
The selenium rectifier used to derive the bias voltage was a disposals oddment and its ratings are unknown. It is called on to deliver approximately 10 Ma. so most small types would probably be suitable.

The output transformer was removed from a defunct 522 transmitter.

The unit's power requirements are modest. At 12 volts the heaters draw only 0.45 amp. and the h.t. drain is 30 Ma. at 250v.

The use of a crystal microphone in preference to the more usual carbon type needs no apology! Modern types are quite rugged if handled sensibly and the increased intelligibility is an important factor in low power operation.





C1—50 pF.
C2—25 uF., 40 p.v.
C3—0.1 uF.
C4—0.01 uF.
C5—8 uF., 525 p.v.
C6, C7, C8, C9—50 uF., 40 p.v.
R1—47,000 ohms, ½ watt.
R2—3 megohms, ½ watt.
R3, R7—2,000 ohms, 1 watt.
R4—1 megohm, ½ watt.
R5—500,000 ohms, ½ watt.
R6—1 megohm potentiometer.
R8—47,000 ohms, 1 watt.
R9—1,000 ohms, 1 watt.
R10—320 ohms, 1 watt.

CONSTRUCTION

Complete shielding of the wiring was provided by constructing the unit on a copper plate which was fitted to an I.F.F. switch box. A short length of cable terminated in an octal plug is brought out to the power supply.

ALTERNATIVE TYPE VALVE

Information has just been received that a new tube type, 12BH7, having higher plate dissipation than the 12AU7, but otherwise similar characteristics, is now available.

Operating voltages, etc., are unknown, but should adjustment of the bias voltage be required, this may be achieved by altering R10 and R9.

Intending constructors should investigate the possibilities of this tube.

AERIAL REFLECTIONS*

BY F. J. CHARMAN, B.E.M. (G6CJ)

THE Reflex Aerial is a new type of array which should be very useful in the u.h.f. bands. It was originally described in German, and a scale model for 3000 Mc. has satisfied the writer that the claims made for gain and beamwidth are justified. Its construction is quite straight-forward, and it has that great advantage always sought after in aerials—a single radiator and feed point. The immediate success of the model shows that there will be no difficulty to get it going well on the u.h.f. Amateur bands.

PERFORMANCE

The aerial, a model of which is shown in the photograph, is in effect a kind of Yagi array, but instead of a row of directors, use is made of multiple reflections between a main reflector sheet and a grating. The effect is rather similar to that produced by two parallel mirrors; the infinite series of images represents a long line of directors in front of the aerial.

This photograph shows the author's Reflex Aerial for 3000 Mc. which was used to check the performance. The construction is clearly shown.

The original published figures, which were obtained at 940 Mc. using reflector and grating about one wavelength square, are half-power beamwidth about 40° and gain 11 db. With the area increased to two wavelengths square, the performance was improved, the beamwidth being 35° (E-plane) and 40° (H-plane), the gain 13 db, and the back-to-front ratio over 20 db. The impedance of the radiator was 120 ohms.

The patterns obtained with the writer's models were rather sharper than those quoted for the original. This is probably because the grating was adjusted to a somewhat higher reflection coefficient, resulting in more partial reflections and a longer equivalent array.

Fig. 1 shows the E- and H-plane patterns of the two wavelength-square model, the half-power widths being 26° and 30° respectively. There were no appreciable minor lobes to the pattern, and the back-to-front ratio was 27 db. The gain calculated from this pattern is 16 db. A smaller model one wavelength square had a noticeably wider pattern, with small minor lobes (—10 db) about 120° off the main beam axis; the gain was, of course, lower.

* Reprinted from R.S.G.B. "Bulletin," Aug., '56.

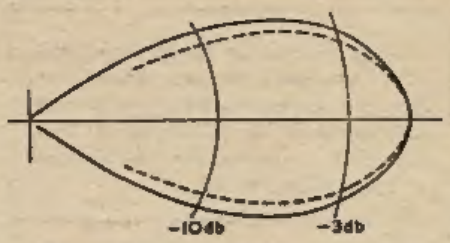


Fig. 1.—Measured radiation patterns of Reflex Model Reflex Aerial.

CONSTRUCTION FOR 440 AND 1250 Mc.

The dimensions below are scaled from the 3000 Mc. models, and aerials made to them can certainly equal the performance of the original, and could equal that of the models. None of the dimensions is critical, except possibly those of the grating, as discussed later.

For 440 Mc. a frame 30 in. square will give an aerial with a gain of 11 to 12 db, but a 4 ft. 6 in. square would give the higher performance, and is still quite a practicable size. In either case the grating could be made from ¼ in. diameter tubes or 1 in. wide foil strips placed 7½ in. apart, five bars being needed for the former and eight for the larger model.

In order to minimise windage (and cost) the reflector can be constructed from 1 in. mesh galvanised wire netting mounted on a wood or metal frame. Four corner posts can support two bars for holding the grating 12 in. ahead of the reflector. The whole of this frame and grating can be metallically joined, as was done in the models, without ill-effect. The dipole driving element, say, ¼ in. tube 12½ in. long, is mounted in the centre of the frame with its conductor parallel to the grating bars, about 7½ in. from the reflector.

For 1250 Mc. everything would have to be scaled down in the wavelength ratio. The frame would be 18 in. square, the grating would be of 5/32 in. diameter rods or 5/16 in. wide foil, and set 4 in. from the reflector, whilst the dipole would be about 2½ in. from the reflector. Half-inch mesh netting will be fine enough at this frequency to prevent any leakage to the back.

The performance of the 3000 Mc. model was not particularly affected by variation of dipole/reflector spacing, and therefore it may be possible to adjust the feedpoint impedance nicely by such an operation, though this has not been tested. The claimed impedance of 120 ohms could be matched by quarter-wave transformer to a lower value, using 80 ohm twin to reach about 50 ohms, or 95 ohm (Telcon B.A.3) screened twin to match to 70 ohms. In either case a balun would be needed if concentric main feeder were used. The velocity factor of both these cables is 2/3, so the quarter wavelength should be 1970/f inches, or 4½ in. for 440 Mc., and 1½ in. for 1250 Mc.; the shortest possible joints should be used.

PRINCIPLE OF OPERATION

In order to see how the aerial works, it is necessary to understand the behaviour of a grating. On long wavelengths a grating of conductors laid parallel to the electric field of a wave acts as an almost perfect reflector. As the wavelength is reduced there comes a time when the wave is small enough to pass between the bars; for wavelengths shorter than, say, the spacing of the bars, the grating is as transparent as a glass window. It thus behaves like a high-pass filter, and we can, in fact, study it in terms of filter theory—the duality is mathematically exact. When the conductors are parallel to the electric field, currents are induced to flow along them, just as they are in a dipole, and the inductance of the bars produces an inductive shunt impedance to the wave which is trying to pass through, and which is a short circuit at very low frequencies. The grating can thus be compared to a high-pass filter in mid-shunt connection (Fig. 2).

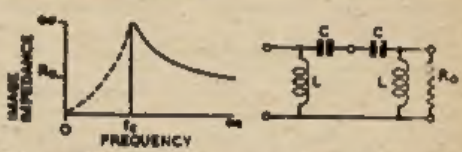


Fig. 2.—High-pass filter equivalent of the grating, and its image impedance. L represents the inductance of the bars, and C the capacitance between the bars.

It will be seen from the circuit of Fig 2 that at the lowest frequencies the filter offers a short circuit, because the inductive reactance of the coil is substantially zero, and therefore that any energy applied to the input terminals is reflected. At a frequency known as the cut-off frequency, where the inductance is balanced by the series capacity (which corresponds to the capacity between the bars) a transition takes place from reflection to transmission and above this point energy will pass through the network.

The nominal impedance Ro of the filter is $\sqrt{L/C}$ but its image, or matching impedance, only has this value at infinite frequency; towards cut-off it rises to high values, and below cut-off is inductive. The grating behaves in the same way. The impedance of space (considered as a transmission line) to a radio wave is 377 ohms, and this is the Ro value of the grating filter. Thus, near the grating cut-off, where its wave impedance is high, wave and grating are badly mismatched and reflection takes place; some energy passing through, but the greater part being thrown back. Because the impedance of the grating or network is inductive near cut-off, the phase angle of the reflected wave is not quite 180° as it would be for a perfect reflector or a short circuit. In the aerials described above the reflection coefficient has been adjusted to 0.7 to 0.8 with corresponding phase angles of 135° to 145°. Rather more than half the incident energy is reflected. The phase must also be allow-

ed for in spacing the grating from the main reflector, in order to bring the multiple reflected components into phase in the forward direction.

In the aerial, if the reflection coefficient is 0.7, half the incident power passes through the grating, and half is returned to the back wall, whence it comes forward again to have another "go" at the grating, the process being continued indefinitely until effectively all the energy is radiated. If the spacing of reflector from grating is correct, then all these components will add up to make a strong signal in the forward direction. It will be seen, therefore, that the grating is used many times, and the aerial acts as though it were extended forward, with a series of progressively weaker images of the grating acting as a row of directors. For this reason it has been called the Reflex Aerial.

Fig. 3 illustrates this. All forward components A, A', A", etc., are in phase, each one 70 per cent. of the amplitude of its predecessor. The vector sum of all these reflections (the sum of an infinite geometric progression) is a straight line of length 3.4 x A. This, plus 3 db for the main reflector, is roughly the gain of the aerial—13½ db.

Fig. 3.—The principle of the Reflex Aerial.

In the oblique direction B the components lag behind each other because the path length between reflections is greater. The vector sum of the components (Fig. 3) for a phase lag of 45° is only 1.4, i.e. 8 db less than the A-total. This is not strictly true because the reflection of the grating increases at oblique angles and is always 100 per cent. at grazing incidence. Although this helps to sharpen the beam, it can also result in minor lobes of radiation if the grating is not adequately large.

There is room for some experiment with the effect of varying the grating. The reflection coefficient depends on the ratio of conductor diameter and spacing to the wavelength. By making the grating more "dense" to bring the reflection coefficient up to, say, 0.9, it is theoretically possible to reduce the beam width below 20° and bring the gain near 20 db.

The correct spacing would then be nearly a half-wave. On the other hand, one would be working very near cut-off, so the performance would be much more sensitive to frequency change. There would also be an increased tendency for the signal to leak sideways.

REFERENCE

The theory of the Reflex Aerial, together with the practical results quoted above, are given in the following paper:

G. von Trentini, "Reflex- und Leitscheiben-Antennen fur Dezimeterwellen," N.T.Z. November, 1955, p. 569.

D.X.C.C. LISTING

Listed below are the highest twelve members in each section. New members and those whose totals have been amended will also be shown.

PHONE

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK4FJ	21	182	VK3JD	1	155
VK4HR	12	182	VK4KS	9	152
VK6RU	3	178	VK6KW	4	150
VK3ATN	26	177	VK4RW	23	147
VK3BZ	3	176	VK3LN	11	141
VK3EE	10	163	VK3AWW	14	140

C.W.

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK4FJ	29	224	VK5BY	45	183
VK3BZ	6	222	VK3CX	26	192
VK3FH	15	215	VK2EO	2	183
VK4HR	8	212	VK4EL	9	175
VK3XU	48	201	VK5RX	23	169
VK3KB	10	200	VK3YL	39	168

OPEN

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK2ACX	6	239	VK3JE	12	196
VK4FJ	32	233	VK2NS	16	195
VK3BZ	4	231	VK3BG	3	190
VK4HR	7	224	VK4EL	10	175
VK6RU	8	211	VK6KW	13	171
VK3XU	61	209	VK2DI	2	170

IONOSPHERIC PREDICTION CHARTS

The Ionospheric Prediction Service, Canberra, has suggested a better means of presentation of the monthly Prediction Charts. Both the old and new style for February are printed below to show readers the difference. In future "Amateur Radio" will publish the new style.

The following extracts from the Ionospheric Prediction Service's letter includes the method of reading the new chart:—

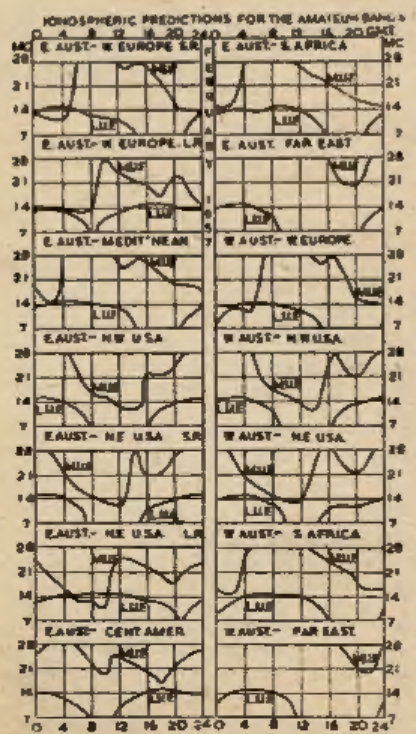
"It has been the policy of the Ionospheric Prediction Service to continually endeavour to improve both the accuracy and the form of presentation of the predictions. As an example of our efforts to improve the method of presentation, we now produce about one hundred charts per month similar to those given in the Amateur predictions. These provide predictions for several hundred point to point circuits and in fact for nearly all the important radio circuits operated in and around Australia. Previously users had to laborously derive their predictions from a set of contour charts.

"The case of the Amateur predictions has been considered to see if there is any way these can be improved. Because of the need to limit the space occupied by these Prediction Charts, they are very small and this makes it difficult to read them to any great accuracy. This is particularly so in the case of the time scale.

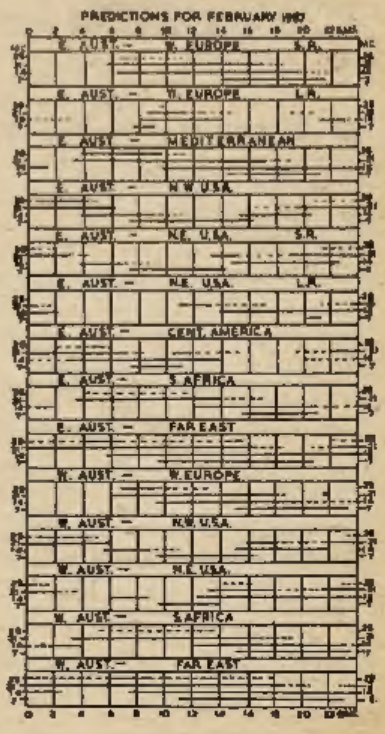
"A method of presentation has been devised in which the predictions for the important frequencies (7, 14, 21 and 28 Mc.) for the fourteen cases are shown in the same area but with the time scale double that given by the old method.

"In addition, using this form, it is possible to indicate the period during which **communication should be possible on all days (full line) and that on at least half the days (dotted) for the month.**"

OLD STYLE FOR FEBRUARY



NEW STYLE FOR FEBRUARY



Multi-Band Single Untuned Feeder System

BY C. J. COOKE,* VK4CC

For the 1956 R.D. Contest the author was in need of an all-band antenna which, as far as possible, was to include the following features:

(a) Good performance for the distances involved.
(b) It must be capable of being used on all bands from 80 to 15 metres with the minimum of effort.
(c) Be capable of suspension from a single 33 ft. pole centrally placed in the backyard of a suburban allotment 45 ft. wide.
(d) Use only one transmission line.

After experimenting with various types of antennae, they were discarded because of the lack of one of the desired features, the main one of which seemed to be that antenna tuning units were required.

Suddenly the thought occurred that a method employed for t.v. multi-channel antenna systems could be borrowed. So, with the aid of two very capable assistants, an antenna (diagrammed in Fig. 1) was designed and erected within two hours.

On-the-air tests proved it to be the best multi-band antenna so far erected in a small backyard.

The experimentally-minded may be able to make the unused elements act as parasitic reflectors or directors. The antenna corresponding to the frequency in use is the only one which presents a correct low resistance load to the feed line. All others present a very high impedance with very little reactance as far as can be determined.

Although co-ax is specified, because it is suitable for connection to the output of a pi coupler final, there is no reason why 72 ohm ribbon could not be used if link coupling is used or if otherwise required. Certainly it would be more electrically balanced.

The first night of operation with this antenna included HP3FL and VK1LJ on both 20 and 40 metre phone with both station's antennae end-on to Panama. 15 metre commercial signals are very strong. At the time of writing, a Swiss broadcast station is S9 plus. Where are the Amateurs though?

* 79 Kuran Street, Chermside, Brisbane, Qld.

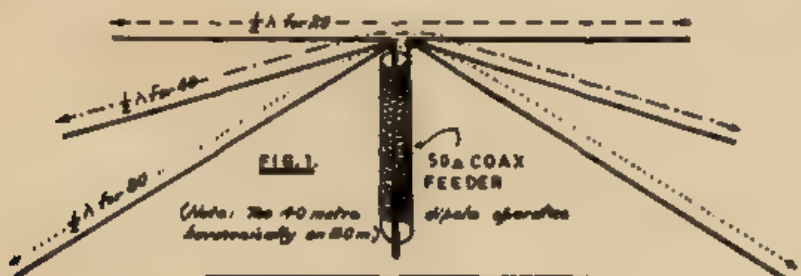


FIG. 1.

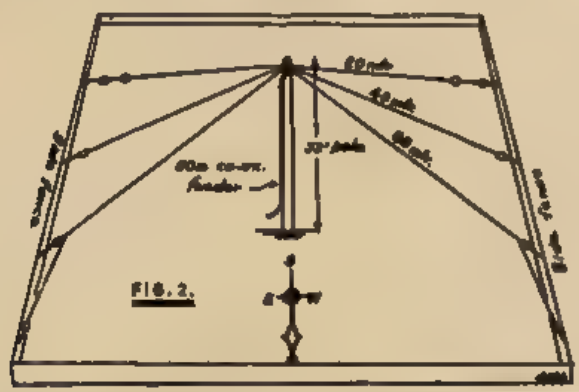


FIG. 2.

AMATEUR CALL SIGNS

FOR MONTH OF NOVEMBER, 1956

NEW CALL SIGNS

VK— **New South Wales**

2ZCR—R. M. Marsden, 127 Anzac Pde., Kensington.

Victoria

3ABP—W. M. Rice, 54 Maidstone St., Altona.
3AJE—H. W. Ellis, C/o. 34 Toolangi Rd., Alphington.
3ZAF—P. E. Linden, 723 Toorak Rd., Kooyong, S.E.4.
3ZDD—J. E. S. Day, Yole St., Boort.
3ZDL—D. H. Goldsworthy, 5 Prince's Street, St. Kilda.
3ZEE—J. Sapir, 1 Kyeamba Gr., Toorak.
3ZER—G. A. Hassell, 69 Hall St., Moonee Ponds.

[redacted]
4KA—K. A. Smith, "Marawah," Rochedale Rd., Rochedale.

South Australia

5LA—R. E. Langfield, R.A.A.F. Station, Edinburgh Airfield, S.A.
5OW—E. H. White, 45 Mitchell St., Darwin.
5TI—J. C. Torr, R.A.A.F. Station, Edinburgh Airfield, S.A.

[redacted]
6AV—P. J. Phillips, Boroko, Pt. Moresby.
6RL—R. S. Lawton (Rev.), Methodist Mission, Salamo.
6AB—A. C. Hawker, Mawson.
6AC—C. S. Nilsson, Mawson.
6AS—A. H. Sandilands, Mawson.
6CJ—C. J. McNaughton, Macquarie Island.
6PK—P. King, Mawson.
6RR—R. G. Arnel, Mawson.
6ZN—B. E. Shaw, Mawson.

CHANGES OF ADDRESS

VK— **New South Wales**

2EG—W. J. Storer, Lot 11, Prince Charles St., French's Forest.
2KO—J. E. DeCure, 9 Hayes St., Neutral Bay.
2UN—R. J. Scott, 43 Brae St., Inverell.
2ZH—N. McNaughton, 50 Killeaton St., East St. Ives.
2APB—K. H. Branford, 1 Centennial Ave., Lane Cove.
2ATS—T. R. Stockman, 15 Shirley St., Inverell.
2ZBI—W. A. Thomas, "Cooba East," via Jumee.
2ZDB—A. J. Bowman, 180 Ernest St., North Sydney

Victoria

3HB—A. C. Hawker, 75 Lloyd St., Dimboola.
3SZ—S. I. Zeunert, 93 Paget St., Glenroy.
3TZ—T. E. Monks, 65 Victoria St., Sandringham.
3ACA—J. A. Adcock, Staff Mess, P.O. Box 3, Yallourn.
3ALF—L. R. Fowler, 60 Herbert St., Northcote.
3AWI—H. Oldham, 34 Northcliffe Ave., Edithvale.

Queensland

4ZAE—A. M. Simpson, Cr. Baden Powell and White Sts., Everton Park, Brisbane.

South Australia

5ST—R. T. Southwood, 28 East Point Rd., Darwin.

Western Australia

6BS—B. H. Smith, Manmanning.
6LA—L. C. Allen, C/o. D.C.A. Aerodrome, Pt. Hedland.

CANCELLED CALL SIGNS

VK— **New South Wales**

2RF—W. R. Felton.
2ADD—D. L. Dowling.

Victoria

3AEJ—O. L. Evans.
3ALN—A. S. W. Taylor. Now VK5LZ.
3ALV—L. G. Watson.
3ZBO—R. F. V. Crewe. Transferred to N.S.W.

Queensland

4EW—E. H. White. Now VK3OW.
4FA—A. Field. Transferred to N.S.W.

PERMITS GRANTED FOR TELEVISION EXPERIMENTS

VK— **New South Wales**

2ABH/T—H. P. Mulligan, 82 Horton St., Yagoona.
2ABO/T—E. A. Isaacs, 43 Tupper St., Marrickville.
2APB/T—K. H. Branford, 1 Centennial Ave., Lane Cove.
2AVI/T—A. Isaacs, 43 Tupper St., Marrickville.

CORRESPONDENCE

"GROUPED" FREQUENCIES

Editor, "A.R.,"
Dear Sir,

On behalf of Ballarat Amateur Stations operating regularly on 144 megacycles, I wish to make known to other stations that we have, through necessity, "grouped" our frequencies on that band.

Because of the close proximity of all stations in Ballarat, we have found difficulty in QSO with distant stations because of strong local stations. This has forced us to co-operate in a band-plan which not only should help us but will also enable stations outside Ballarat to find us easily.

Starting at 144.26 the frequencies will be spaced 20 Kc. apart, viz. VK3PO 144.28 Mc., VK3ZL 144.3 Mc., VK3ZBS 144.32 Mc., VK3ZDM 144.34 Mc., and VK3ZCF 144.36 Mc., with at least two other stations to be adapted to the plan.

We realise that someone else will unfortunately be within the frequencies we have and apologise if we are going to cause them undue trouble. However, we have given the step a good test and we feel that our action will be to the benefit of all in the long run.

—B. M. Stares, VK3ZBS.

ON ERECTING TOWERS*

BY R. E. MOREN, W4INL

I have been the proud owner of a self-supporting steel tower for several years. Since so many people have asked me how it was erected it appears that this may be the propitious moment to provide the details of the assembly operation. Thus, all those who wish to provide similar support for their rotary beams or a locale for large bird feeders may profit by my efforts.

The construction work began when a large truck backed into my driveway and deposited a modest amount of assorted angle, nuts, bolts, etc., on my early summer Johnson grass. This created much consternation, particularly with my top sergeant who arched her eyebrows and exclaimed, "That is $250.00 worth?" Feeling somewhat miffed by her failure to appreciate the finer things I set to work looking for the assembly instructions, all the while dreaming of those S9 s.s.b. reports in Asia.

Having located the instructions, complete with pictures, I noted they casually mentioned digging holes about 4½ feet deep to anchor the base. This phase of the operation was begun at once. Three hours and two feet of the first hole later, it became apparent that North Carolina clay was not designed for digging. Nevertheless, I obviously owned a vast amount of raw material for the manufacture of brick and from this I managed to eke a tiny bit of melancholy satisfaction. The digging also provided a difficult way to while away my idle moments and develop a deeper appreciation of the power of the Almighty who had put the stuff there in the first place.

Some eight days passed. After convalescence from a slipped disc and the mild case of bursitis brought on by the exploration of my mineral rights, the time arrived to begin assembly of the tower. Since all my neighbors are teetotalers (while living at home), a gin pole was out of the question. Hence, it became mandatory to assemble the tower piece by piece.

The first twenty feet of the tower was assembled with base legs resting in the holes, but not anchored. I had planned to level the assembly at this point and then pour the concrete. This section of the tower was made plumb with peaches since no plums grow in this area. Sure enough, when a peach was suspended it hung straight down just as the instructions claimed. Unfortunately, the tower did not hang straight up. This led to a number of snide comments from the neighbors who, up to this point, had given freely of advice but nothing in the line of muscle power. After much tugging and pushing, things looked a bit better, but a slight list to the southeast persisted which I attributed to earth rotation, the pull of the moon or some other nebulous natural phenomenon.

The assembly work continued. I would hoist the pieces up the tower, bolt them in position and as sections were assembled, climb to the next horizontal member dragging a 1 x 6 behind me. The 1 x 6 was used as a bench of sorts and a platform when it became necessary to stand. At the forty level a mishap occurred which frightened me slightly. On second thought, it might be more accurate to say I was terrified because for several days I shook like the rear seat on the crosstown subway. It had its compensations, however. For the first time in sixteen years I managed to get the right number of dots when I thumbed out a five on my old Vibroplex.

The accident occurred after I had bolted one end of a horizontal member in place and had pushed the opposite end on the bolt. While stopping to get the nut the member slipped off the bolt and pivoted on the anchored end. The free end described an arc as it dropped and plowed a furrow across the back of my head. I staggered to the corner of the tower and sat down, clinging tenaciously to the vertical upright. Blood was streaming down my back. I remember that I thought my wife would be mightily perturbed . . . blood all over that new 69c. tee shirt. I also recall thinking it was a rather ignominous way to get a "Silent Key" mention. Nothing respectable like a quiet self-electrocution. It was downright humiliating. So humiliating in fact that I climbed down the tower and went to the doctor.

He looked me over carefully. "Hmm," he hmmed. "Don't normally repair these beer bottle cuts this early in the day. That'll be three dollars." I paid the three bucks which worked out to 50c. a stitch and went home

Festivities continued the next day and in a few hours I was ready to cap the tower and start thinking about building the beam. To my chagrin I couldn't get the cap to line up with the holes. Much tugging and hammering produced no tangible results and I was finally forced to drill a new hole in the tower. This operation entailed the use of a long extension cord for the drill motor which, incidentally, was ungrounded. This latter situation resulted in a teeth-rattling check of my conductivity which I'm forced to report is in the neighborhood of one ohm. Needless to say this is a poor neighborhood.

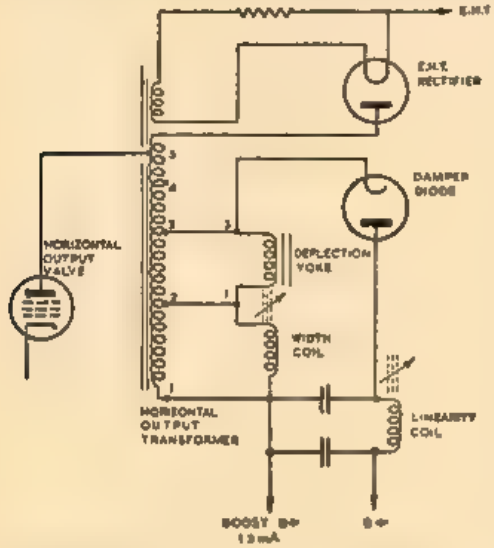
After retrieving the drill motor from a tomato patch three yards and two fences down the street and correcting its deficiences, the tower was completed without further complications. The beam constitutes another story, but it's up now and I estimate an approximate gain of 8 db. However, that crack on the head produced a 9 db. hearing loss which likely could be regained by about 30 more feet on the tower. Now let's see . . . thirty feet . . .

* Reprinted from "QST," September, 1956.

RADIOTRON

TELEVISION VALVE SERIES

The damper diode in a TV receiver increases the efficiency of operation of the horizontal deflection circuit by recovering energy from the magnetic field which is set up — in the yoke and output transformer — by current from the output valve. Briefly the operation is:—



SIMPLIFIED DIAGRAM OF HORIZONTAL OUTPUT AND E.H.T CIRCUITS.

(1) A voltage of approximately saw-tooth wave-form is applied to the grid of the horizontal output valve with the "pulse" of the saw-tooth in a negative direction.
(2) This negative pulse in the grid wave-form cuts off the plate current of the horizontal output valve so that a large positive pulse is developed across the inductance of the horizontal output transformer.
(3) This positive pulse sets up, and becomes the first quarter-cycle of, a damped high-frequency oscillation in the plate circuit
(4) During the first half-cycle of the damped oscillation the cathode of the damper diode is positive with respect to the plate and the damper diode cannot conduct.
(5) During the second half-cycle the cathode becomes negative with respect to the plate causing the damper diode to conduct.
(6) The diode conduction current flowing in the horizontal output transformer (and thus in the yoke) is in fact the first part of the sweep deflection current in the yoke.
(7) As the damper-diode current decreases towards zero, the saw-tooth voltage on the grid of the horizontal output valve is passing from cut-off to less-negative and then positive grid voltages.
(8) The horizontal output valve consequently starts to conduct and draws a steadily increasing plate current through the output transformer and yoke thereby providing the second half of the sweep current.
(9) During the period of damper-diode conduction the horizontal output valve is cut off and current flows into the capacitor across the linearity coils, charging them to a voltage some hundreds of volts higher than the normal B+ supply voltage.
(10) The plate of the horizontal output valve is supplied from this boost supply, thereby making use of the power recovered by the damper diode from the magnetic field of the deflection yoke and output transformer

The damper diode thus provides the first half of each cycle of deflection current in the yoke by rectifying the damped oscillation in the output transformer and then allows the power recovered to be used in the plate circuit of the horizontal output valve.

6AX4GT†

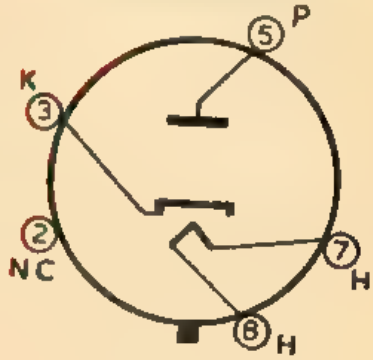
CHARACTERISTICS:

HEATER VOLTAGE	6.3 volts
HEATER CURRENT	1.2 amps.
CAPACITANCE (Heater to cathode)	7.5 μμF

MAXIMUM RATINGS (damper service)

PEAK INVERSE PLATE VOLTAGE* (absolute max.)	4400 volts
PEAK PLATE CURRENT	750 mA
AVERAGE PLATE CURRENT	125 mA
PLATE DISSIPATION	4.8 watts
PEAK HEATER-CATHODE VOLTAGE (absolute max.) (heater negative with respect to cathode).	4400 volts

SOCKET CONNECTIONS



(bottom view)

Pin 2 — No Connection (Do not use.)
Pin 3 — Cathode
Pin 5 — Plate
Pin 7 — Heater
Pin 8 — Heater

*The duration of the voltage pulse must not exceed 15% of one horizontal scanning cycle.
†For further information on the 6AX4GT and other Radiotron Television Valves, consult the TV1 Booklet. Additional copies of this advertisement are available free and post free on request

The A.R.R.L. I.G.Y. Propagation Research Project*

V.h.f. Contact Data to be Collected on a World-Wide Scale

BY MASON P. SOUTHWORTH, W1VLH

THE worth of Amateur observations is recognised in many scientific fields, and Amateur workers of many kinds will participate in the coming International Geophysical Year. Therefore it was only natural that a place be made for Hams in the course of planning the radio-propagation aspects of I.G.Y.

The I.G.Y. itself and the reasons for its being were discussed by Dr. Berkner in the July issue of "QST," and anyone who has not read this back-ground article by now should certainly do so. The possibilities for Amateur participation in connection with tracking the satellite of Project Vanguard, and setting up communications networks to furnish moral support to the Antarctic groups and help give notice of special events were mentioned in the same issue. Another Amateur project, whose purpose is to gather radio propagation data is, perhaps, to be the most important and worthwhile of all. This involves the reporting of v.h.f. DX contacts made by several means of propagation which, although fairly common to a good many Hams in practical communication, are still incompletely explained theoretically.

When there is a job to be done, one tries to pick the best means for doing it. Just so in this case. When it comes to gathering data about propagation phenomena, it's hard to beat a large number of reporting stations operating at all hours of the day and night. If a series of observing stations had to be set up especially for the I.G.Y., the cost of this phase of the programme would be enormous, and results would still not be as complete as could be furnished by existing Amateur stations with their wide distribution. Therefore, when information on propagation was desired for I.G.Y., Hams were a natural for the job

A.R.R.L. and I.G.Y. officials got together as early as the fall of 1955 to see what could be done about setting up a programme of Amateur observations to supplement the more exact—but of necessity limited—information obtained from scatter soundings and the like. The programme which evolved from these talks has now taken on a definite form. The work will be done by A.R.R.L. under an Air Force contract. Dr. Wolfgang Pfister, of the Air Force Cambridge Research Centre, will be the consulting scientist on the programme. The writer will be in charge of collecting and analysing the data for A.R.R.L.

The programme will be concerned with v.h.f. propagation in three main categories; trans-equatorial scatter on 50 Mc., auroral communication on any Amateur frequency above 50 Mc., and sporadic-E skip. In order that no interesting phenomena may be missed, details of any Amateur v.h.f. work over unusual distances will be solicited. It will then be up to the special A.R.R.L. I.G.Y. Staff to sort them out, if the reporting Amateur is unable to do so himself.[1]

The first work in the three fields mentioned above was done by Amateurs using the v.h.f. bands. Transequatorial scatter was turned up when Amateurs in Mexico began working South American stations on 50 Mc., at times when communication should not have been possible, according to any means of propagation then known. Later 50 Mc. operators in many parts of this country and Canada made similar contacts at "wrong" times, and the medium by which these came about is still far from completely understood. It was for the purpose of gathering more data on this phenomenon that scientists working out the scope of the I.G.Y. programme first conceived the idea of enlisting the aid of Radio Amateurs.

Long distance propagation of v.h.f. waves by means of reflection from the auroral curtain, and from sporadically-ionised patches of the E-region of the ionosphere was discovered by Amateurs two decades ago, and their observations have been used effectively in studying these phenomena on many occasions. Notable examples are the Cornell University Auroral Project organised with A.R.R.L. assistance, and the R.A.S.O. programme conducted by O. P. Ferrell under Air Force contract. Because use of Amateur v.h.f. bands is currently at an all-time high, and because the I.G.Y. is a world-wide and concentrated scientific effort on many fronts, timed to coincide with the expected peak of a solar activity cycle, the A.R.R.L.-I.G.Y. programme is an unparalleled opportunity for Amateurs to contribute to man's knowledge of radio wave propagation.

To make the most of this project, reports from Amateurs in all parts of the country will be needed. If you live in one of the less populous sections and make relatively few contacts, don't feel that you can't contribute much. Your reports will be, if anything, more valuable than those from fellows whose areas are well represented. In fact, it isn't necessary to have a v.h.f. transmitter or even an Amateur license to help out. Accurate heard reports will be useful supplements to lists of two-way contacts. It goes without saying that this programme is made-to-order for the Technician licensee. Many of these fellows have already found out what fun 50 Mc. operation can be, but for those who haven't here's a chance to really make that "ticket" count for something.

Not to be overlooked in this project are our brother Amateurs from south of the equator. Their co-operation will be essential, of course, in the equatorial-scatter phase of this programme. Their help will be solicited through member societies of the International Amateur Radio Union.

The reporting involved in the programme will go something like this: All contacts and heard reports which are suspected to have resulted from one of the propagation types outlined above will be listed on the special forms to be available. These forms will be made up so that the desired information can be taken from the regular station log, insofar as possible. Regular operation will, of course, be encouraged. At bi-monthly intervals these report forms will be returned to the A.R.R.L. office handling the programme.

Then the project staff takes over. First the data will be sorted as to propagation type and time of occurrence. Contacts will be selected which are representative of conditions at any given time. From the information furnished about these contacts, calculations of such things as distances and mid-point locations will be made. The resulting data will then be arranged in a form suitable for analysis. At this point the really important job of study and correlation begins. This will go on during the I.G.Y. period, and probably afterwards when the data from other projects is available. If all this sounds rather involved, remember that all the reporting stations have to do is to operate faithfully and send in suitable data on their contacts.

The International Geophysical Year itself will run from July 1, 1957, until December 31, 1958. In almost any new project, certain "bugs" develop. To circumvent this, it has been decided to start collecting data on January 1, 1957, six months early. Thus, we should be in full swing by the actual beginning of the I.G.Y. Do not think that the data collected during this trial period will be wasted—far from it. We can use all the information that we can get. In fact, there has been some talk of the possibility of continuing an investigation of this sort even after the I.G.Y. is over. This will depend on the co-operation received from you, the Radio Amateur.

If you are equipped to operate or listen on any band from 50 Mc. up, and want to take part in what may become one of the major accomplishments of Amateur Radio, write in and let us know. Send your letter to the writer, in care of A.R.R.L. Headquarters. Bear in mind that the programme is in a formative state. Aims and procedures may be modified as the need arises or as new ideas come along. In fact, we hope that the programme will remain flexible all during its existence, since it can contribute the most only by being adaptable to new concepts. If you have any suggestions as how this work can be made more worthwhile, let us know that too.

★

VK Amateurs who are prepared to assist in this project are requested to notify their W.I.A. Divisional Secretaries. Further information will then be forwarded.

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* Reprinted from "QST," Sept., '56.

1 Basic details of v.h.f. propagation may be found in any recent edition of the A.R.R.L. Handbook. 50 Mc. DX was described in May, 1956, "QST," page 22. V.h.f. DX phenomena were discussed in detail in "QST" for February, 1951, page 46.

NATIONAL FIELD DAY, 1957

RULES

1. The National Field Day Contest of the Wireless Institute of Australia will be held on **Sunday, 10th February, 1957,** and will be of 12 hours' duration, commencing at 0900 hours E.A.S.T. and will continue until 2100 hours E.A.S.T.

2. The Contest is limited to Portable Stations operating within the Commonwealth and its Mandated Territories on a power not exceeding 25 watts input to the final stage with the aerial connected, with a special section for fixed stations working to portable stations.

3. A portable station for the purpose of the Contest is defined as one whose power is not derived from either private or public mains, shall not be located closer than five miles airline from the home of the operator(s) and shall not be situated in any occupied dwelling or building.

4. No apparatus is to be set up or erected on the site of the portable station earlier than 24 hours prior to the commencement of the Contest. A station may be moved from one site within a State to another within the same State during the Contest.

5. More than one operator may be used in the operation of the portable station, provided that all operators are licensed Amateurs.

6. Operation may be on any of the recognised Amateur bands and more than one transmitter may be used, providing that only one transmitter is used at any one time.

7. When calling, c.w. stations will use the call "CQ NFD" and phone stations will use the call "CQ National Field Day" to indicate that they are portable stations. Attention is directed to the requirements for portable operation as defined in the P.M.G. Handbook for the Guidance of Amateur Operators.

8. **Sections:** The Contest is divided into four sections, namely:

(a) Open
(b) C.w.
(c) Phone
(d) Fixed Stations.

The open section will consist of phone and c.w. Portable station participants may enter each of sections (a), (b), and (c) provided a separate log is entered in each case.

9. **Logs** must be forwarded to the Contest Committee, **through the Divisional Council** for membership checking in time to reach Box 1234K, G.P.O., Adelaide, not later than Saturday, 23rd February, 1957.

10. Logs must be filled in in the following order: Date, Time (E.A.S.T.), Band, Emission, Power Input to the final stage with the aerial connected, Call Sign of Station Contacted, RST number sent, RST number received, location of station contacted, points claimed. The log must be headed with the title of the Contest, section entered, call sign of the competitor, location of the station. At the conclusion of the log a summary of the contacts must be shown, together with a description of the equipment used including h.t. voltage to the final stage, tube(s) in p.a. stage, antenna used, and call signs of all operators.

11. The completed log must be signed by each of the operators with a statement that the P.M.G. regulations and the rules of the Contest have been observed.

12. The decisions of the Federal Contest Committee will be final in all matters concerning the Contest.

13. Failure to completely observe the conditions of Rule 10 will lead to automatic disqualification of a competitor.

14. **Scoring:** For the purpose of the Field Day the following constitute VK districts: VK1 (A.C.T.) and VK2 combined, VK3, VK4, VK5 (South Australia), VK5 (Northern Territory), VK6, VK7, VK9

15. Serial numbers must be exchanged during the Contest. Failure to record current serial numbers will mean loss of all points for that contact. Serial numbers will be as follows: The first three figures will be the RST report in the c.w. section, followed by the serial number of the contact. Serial numbers may commence with any number between 001 and 100 for the first contact, increasing by one for each successive contact. In the phone section, the first two figures will be the RS report as in the c.w. section, followed by the three serial numbers. In addition the QTH must be given in all cases.

16. Points will be awarded as follows:

Portable Stations—

(a) For contacts with a fixed station within the Commonwealth (Rule 14) including the competitor's own State .... **1 point.**
(b) For contacts with other portable stations within the same State .... **2 points.**
(c) For contacts with stations in Asia, Oceania, North America, **3 points.**
(d) For contacts with stations in other countries other than (a), (b), and (c) .... **5 points.**
(e) For contacts with other portable stations outside the competitor's own State .... **10 points.**

Fixed Stations—

(f) For contacts with portable stations in the Contest within the same State .... **2 points.**
(g) For contacts with portable stations in the Contest outside the State .... **5 points.**

17. **Awards:** An attractive certificate will be forwarded to the outright winners in each section, namely, Open, Phone, and C.w. Certificates will also be awarded to the winners of each section in each State and to the Fixed Station in each State with the greatest number of points gained in contacting portable stations in the Contest. Further certificates may be awarded at the discretion of the Federal Contest Committee. The outright winners are not eligible for State awards.

18. Certificates will be awarded to each operator of the winning stations provided each operator has contacted at least 25% of the stations contacted.

DX ACTIVITY BY VK3AHH†

PROPAGATION REPORT

3.5 Mc.: One report mentions a good opening to **Europe** on 28/12/56, around 1900-2000z.

7 Mc., **European** openings have been reported on both long and short routes (around 0800z and 1800-2100z, respectively). **Asiatic** stations have also been reported (1200-1700z). **North America** was represented from 0500z to 1400z.

14 Mc.: Conditions deteriorated during the month of December. However, openings to all continents have been observed. With openings overlapping, optimum conditions seemed to prevail at the following times: For **Europe** 0700-0930z, 1100-1300z, and 1900-2300z; for **Africa** 1400-1600z, and 1900-2300z, for **South America** 0600-0700z, 1000-1200z, and 2000-2300z.

21 Mc.: This band opened to **Europe** between 0800 and 1800z, and to **Africa** around 0600-0900, while conditions to the **American** continents covered the entire twenty-four hours with signals of varying strengths.

28 Mc. Here openings to **America** were confined to the period 2300-0300z, with **Africa** around 0800-0900z and **Europe** 1000-1200z.

NEWS AND NOTES

The International Geophysical Year will see the establishment of another Australian station on the Antarctic mainland and the expansion of the present base at Mawson. Consequently, the number of Antarctic Amateur licensees (now VK0s) has reached an all-time high, see last month). The W.I.A. was well represented at the departure of the Kista Dan, on 17th December, 1956, with VKs 1DA, ex-1EM, 1IJ (3LJ, 7IJ), 3BG and 3AHH.

Talking of the icy south, ZLs 5AA, 5AB and 5AC will be New Zealand stations in Antarctica (from W6YY).

Welcome home to David Laing, ex-YJ1DL, who anticipates staying in Brisbane for a while (news via NCDXC).

After 1st April, 1957, VO call signs will be re-allocated. VO1 for New Foundland and VO2 for Labrador (both count as Canada) (from W6YY).

ST2NG expects trouble with the renewal of ST2 licences (from 2AIR).

SV0WT may be operating from **Crete** around March/April (from W6YY).

FB8BR will leave Madagascar in March (from W6YY).

The European (W.A.E.) DX Contest, sponsored by the D.A.R.C., appears to incorporate a number of new ideas. Apart from the usual contest operation, participants are invited to increase their score by including, in a contest-QSO, reports on previous contest-QSOs with other European stations. Also, the two sections (each covering one week-end) are spread over several months, with the final c.w. section to take place on 6th April, 1957. Contest operators will welcome these changes from the common-garden type of DX Contest but future will tell how popular and practicable they are. Good luck!

QTHs OF INTEREST

(from W6YY, NCDXC, VK2AIR, BERS195, and Rod de Balfour)

VS2CV—E. W. Hunt, Police HQ Sigs BCH, Kuala Lumpur, Malaya.

ZC5JM—Cpl. Pat. McGill, R.A.F. Detachment Labuan, Brit. Nth. Borneo.

ZS6AQA—Saville Shapero, 10 Rambler Road, Kensington, Johannesburg, South Africa.

XW8AC—Box 87, Vientiane, Laos.

KM6AX—Terry Foley, 4600 Richelieu Terrace, Los Angeles 32, Calif., U.S.A.

† Hans J. Albrecht, 10 Belgravia Ave., Box Hill North, E.12, Vic.

* Call signs and prefixes worked.

z—zero time—G.M.T.

ACTIVITIES

3.5 Mc.: Frank **2QL** heard YU2HT, DL6NB, DJ2ZB, OK2KLI, G3LKB, and SP3AC/MM. Dave **WIA-L3039** heard VK0AA (Macquarie Island).

7 Mc.: **2QL** reports G* and ZS, DL, YU, VE. Alan **2AIR** contributes F8VJ*, VR2DA*, W6ETY/KL7*, 3W8AA*, VE2LJ*, VR1A*, K4AQL/KG6*. Eric **BERS195** heard YU2CE, OK1KTW, UA1AL, UA1DH. **WIA-L3039** reports JA5AI.

14 Mc. C.w.: **2QL:** ZS2MI*, EA8BF*, PJ2ME*, and 3W8AA, ZS3DP. **2AIR:** Europeans*, PJ2-ME*, 3W8AA*, YV5DE*, CX2CO*, ET2RH*, KP4URO*, FA8NL*, ST2NG*, YV5HL*, KC6-KG*, ZK2AD*, HP1LO*, HK3KC*, HC1LE*, EI4A*, LU3HL*, KP4JE*, VP6GT*, KA0IJ*, VR3B*, VP3YG*. Neville **2APL:** SM*, VE*, VS* Jack 3JJ. I5REX*, FB8AE*, ZS9P*, ZS8*, ZE3JL*, VQ6LQ*, CR10AA*, Europeans*, OD5-AI*, VQ5QJ*, LU7AS*, LU8ZW*, LU7GP*, LU0AC* Ivor **3XB** 4X4*, YV5HL*, PJ2ME*, ZC4*, HK5CR*, PA*, EI*, YU*, SM*, EA*, DJ*, G*, OH* Lance **3ZA:** CT3AB*, CT*, G*, GC*, and CE0AA, ZD2, PY. John **3ZC:** OY7S (on 14100). Doug **5BY:** PJ2ME*, VP2LU* John **5HI:** KZ5LB*, ZS6XL*, ZS6AHV* Bill **5HE:** ZE1JV*, PJ2ME*, KP4YP*, DJ*, F*, ZC4CH*, EA*, YU*, GW*, HK5CR*, ZS6AD*. Harry **5MY** PJ2ME* Rav **5RK:** XE1RM* Austin **5WO** VQ6LQ, VQ2GW*, SM* **BERS195:** ET3-AF, FE8AE, OQ5BT, TF8TP, XE1RM, ZC4CZ, 5A5TH, HB1OG/MM. **WIA-L3039:** OE. VU2DR, KP4TIN, 3W8AA, AP2RH, 4S7LJ, VU2KM, 4S7-MR, DJ, VU2KL, G, UA, HP1LO, VU2JK, VS. **2AHH:** G*, OH*, DL/DJ*, F*, FA8RJ*, OE*, SM*, VE*, CE3ZO*, VU2KM*.

14 Mc. A.m.: **5HI:** SV0WL*, CT3AC*, F9YP/FC*, EA*, TG9TU*, CE2CO*, VQ4KRL*, TI2-HP*, TI2RO*, TI2VJ*, TI2OP*, HR1LW*, 4S7-LM*, VS*. **5WO:** ZD6DT*, LA*, VP9DC*, OE*, VQ2DC*, VQ4KRL*, FF8BR*, ZS6ANE*, 4X4-DK*, HR1EZ*. **BERS195:** ZD6DT. **WIA-L3039:** BV1US. **Rod de Balfour:** G, GI, GM, CT, EI, EA, DL, I, HB9, F, ET3US, SU1ME, 5A5TH, 5A1TA, CN8MM, ZS6BW, ZE5JJ, VQ8AH, ZD6-DT, 4X4DR, 4X4JC, HZ1AB, HZ1TA, MP4KDS, AP2Z, AP2U, VU2GD, VU2CQ, VU2ES, VU2CW, VU2BK, XZ2KN, 4S7YL, 4S7WP, VS, KW8AC, JA, BV1US, KR6, DU1AP, JZ0PA, FU8AD, VE, YN1RA, HR3HH, HR1ER, HR1LW, TG7CB, TG0AL, TI2HP, TI2RC, HP3FL, HP2DA, KZ5-DX, XE1KW, CO2BK, OA6LB, HK3FT.

14 Mc. S.s.b.: Here is a combined report of s.s.b. doings by **2VA, 2ZF, 2SK, 2AEE,** as forwarded by Bob **2SK:** BV1US*, TI2HT*, ZD6ZB*, SV0WA*, CN8GD*, G*, VE*, KP4AB*, TI2-WBI*, ZS6TE*, GM*, I*, F*, HR2WC*, SM*, HB9*, TG9AD*, HR2WT*, XE1A*, KC4USV*, HR1EZ*, ZB1CZ*, KP4ES*, XE2JK*, and a large number of Ws*.

21 Mc.: **2QL** ZB1HKO*, KP4KD*, ZS1IC*, ZS1KD*, KZ5KG*, FA8RJ*, KG4AN*, 3W8AA*, UA*, VU2JA*, OZ*, G*, GM*, SM*, OH*, DL*, ON*, PA*, CT*, and OD5AV, CN8FJ, FU8AC, HP1LO. **2AIR:** JA*, UA*, KP4GR*, KZ5KK*, XE1PJ*, DL*, G*, ON*, CT*, KP4KD*, OK*, OE*, 3W8AA*, OH*, SM*, PJ2AK/P*. **2APL:** G*. **5WO:** HC1ES, KZ5CP*, DL*, G*, GM*, ON*, VS4NW*, PA* **WIA-L3039:** G, JA. **Rod de Balfour:** G, GM, GD, DL, ON, OH, LA, F, I, SM, LX1DC, MP4BBF, DU7SV, VS, KR6, VS4-NW, HR1LW, VP6WR, HK1DZ.

28 Mc.: **2QL** reports KR6QW*, SM*, OH*, G*, and DL, ON, JA. **5WO** adds 5A1TA*, G*. **Rod de Balfour** heard G, VS, VE4RO, JA.

Rare QSLs were received by: **2QL:** CR10AA, CR7CI, VS4BA, I5RAM, LU9ZB, HA5BW, YJ1-RF, CN8DJ, ZB1AY. **2AIR:** HK3PC, I5RAM, ST2NG, FA8DA. **5WO:** VS4BA, ZE5JJ, VR4AA. **BERS195:** VQ8AD, ZC5JM. **Rod de Balfour:** PA0NU, KZ5DC, AP2U, XS7C.

Thanks to W6YY and the Northern California DX Club, and VKs 2QL, 2AIR, 2APL, 3JJ, 3SK (QSP 2VA, 3ZF, 3AEE), 3XB, 3ZA, 3ZC, 5RK (QSP 5BY, 5HI, 5HR, 5MY), 5WO, and BERS195, WIA L3039, Rod de Balfour.

S.W.L. SECTION*

No doubt everyone is busy building gear during the holiday season or listening intently for that elusive DX as only two letters have been received this month. Still, I guess there will be a full roll up next month to compensate. How about it all you s.w.l's.? Let's know all about your holiday activities.

And so to the correspondence for this month. Dave Jenkin, WIA L3039, writes from Orbost to tell us the happy news. Yes! His new rx is going. It covers the broadcast band, 3.5, 7, 14, and 21 Mc. bands, using five tubes, a germanium diode and four transistors. Dave has yet to iron out a couple of faults, namely getting the xtal filter working and the S meter functioning properly. He did have some trouble with the first i.f. stage to begin with, but soon had that righted. Now we will wait to find out just how good the rx really is. Thank you very much for your letter, Dave.

John Campbell, WIA-L5011, gives us the latest dope on the VK5 Group doings. The VK5 S.w.l. Group Christmas Social, held on December 16, was an unqualified success, about 30 persons attending. Among the visitors were John 5KX, Gordon 5XU, Brian 5CA, and Les 5LC, all of whom have aided the Group in some way during the past year. Thanks are due to these Amateurs for the job they are doing in helping s.w.l's. (Thanks for the QSL card too, Les.—I.H.) Normal business of the Group was suspended for the evening and a good time had by all.

Alteration to VK5 Group Meetings.—Now that the A.O.C.P. classes have moved to other accommodation from their previous meeting place at the Methodist Mission, the VK5 S.w.l. Group meeting night will fall on the third Monday of each month at 8 p.m.

D. Colebatch, WIA-L5024 has heard the following recently: 14 Mc.—FK8, G5, JA1, TI2, ZM6. 21 Mc.—DU1, JZ0, KA2, TI2, VE6, YV5. 28 Mc.—GW3, G3, VU2. Len Cragen, WIA-L5004, has managed to log F9, FK8, I1, JA, KA, KG6, KH6, VK1, W, ZM6, G, CR9, BV1, DL, DU, FU8, JZ0, LA8, LU9, VK9, VR2, VS2-8, YV5, ZL, ZS5, 4S7, KR6, VU2.

That then is the sum total of correspondence received for this issue. As there was no December meeting of the Victorian Group, not much has been heard of members. However, Michael Ide is understood to have had a late night recently. Up listening for DX Michael, or getting that v.h.f. gear going again? Yours truly has been doing very little listening lately, but the shack is now neatly arranged, QSL cards on the wall, and the beam can even be rotated without going outside.

Whilst making a few purchases at a city electrical store during the week, I quite accidentally discovered that I have another reader of this page. His name is Martin Koffel, recently from Wagga in VK2 land. Martin has been using an AR7 rx and is a really enthusiastic s.w.l. We hope to see you at our meetings, Martin.

While browsing through a copy of an American Ham magazine some time back I came across a letter on the subject of "What people talk about on the air." As an ardent s.w.l., I decided I'd find out just what VK Hams talk about, and so I have made short notes each time I hear something humorous or unusual. Following is a list which I have made up from my notes.

The use of fruit trees, flowers and shrubs as ornamentation. Forming a mental picture of the other operator (ugh!) Air conditioning. Availability of steel. Eating fish and drinking at the same time. Yorkshiremen as cricketers. Parasitic arrays versus driven elements. The "art" of buying shows (any comments, 3OM). Number of spoons of sugar to a cup of tea. Hang-over remedies. Father Christmas. Erection of towers and masts. Bald heads.

C.w. versus phone, s.s.b., f.m., etc. Fishing bait. Indexing systems. Pyjamas. Dust storms. Pig farming. Newspapers. Mixing paint. Nylon shirts. Dancing. Floor coverings. Motor cars and associated troubles. Building ideal rigs. Which direction to point your beam. Ice cream. Ladders. Babies, dogs, cows, sheep, cats, XYLs, DX and, of course, the weather.

Perhaps someone could supply a supplement to this list, but I promise you that if you decide to do some really solid mail reading you'll become very well informed on a great variety of subjects and have some really good laughs into the bargain.

Well, as one cartoon character once said, "That's all for now folks," so here's hoping to receive lots of letters and news between now and next month, and till then good listening, DX, and may much fun be yours.

* Compiled by Ian J. Hunt, WIA-L3007, 211 St. George's Road, Northcote, N.16, Vic.

YL CORNER

BY BETTY MONCUR

"I met a YL called Peta,
When my notes had gone astray.
And as I talked with Peta,
My cares just sped away."

For in Peta Gilchrist, ZL2ABJ, I found a most delightful subject for this column.

Peta, with her husband, Geoff ZL2SK, came over to Melbourne for the Olympic Games. While here they stayed with a relative of Ian Hunt (the secretary of our S.w.l. Group) and Ian brought them along to our 80 mx tx hunt which was where I first met her. Then quite by accident just a few days later, my OM and I met them again at the Olympic Games where we had seats in the row behind them. They also visited us at our QTH and from these meetings I managed to find out all about her.

She is a most energetic person with ever so many different interests. For instance, she is president of her golf club and has been for the last six years and enjoys her golf immensely. Geoff also is a very keen golfer. Another very absorbing interest of hers is playing chess, here again Geoff has this interest with her also. She belongs to a chess club of which she is the only lady member. In her younger days (but I must pause to say that she's not very old even now) she used to enjoy "tramping" as she calls it. She has climbed Ruapehu four times. Ruapehu is the highest peak in the North Island of New Zealand and is permanently snow capped. She does all her own personal sewing and she and Geoff between them have redecorated their home and are at present building a shack at the seaside.

Now as to her radio activities. They developed at a time when she felt she needed a new hobby somewhere round about eight years ago. But it wasn't radio she took up, it was typing and she got on with it very well. Then a friend suggested that she should have a go at c.w., because if you can take it on the "mill" there's just nothing to it. So having mastered the "mill" (the typewriter that is, just in case some of you XYLs are not quite with me) she then turned to c.w. and found this immensely fascinating and went ahead with leaps and bounds. The next thing was, why don't you have a go at the theory and get your ticket, this friend suggested. Here Geoff was a wonderful help to her she said. Geoff, at this time, didn't have his own ticket, but as he is in the P.M.G's. Department in the radio section, he knew radio backwards and was able to help her no end. She admits that getting the theory was one of the hardest things she has ever done in her life and it took a tremendous lot of study and really hard work to get it. She actually got her licence before Geoff got his.

She works on 80, 40, 20 and 10 mx, but mainly she works on 20 mx, she says there is just something about 20 she likes better than the other bands. She has worked 60 different countries, but amazingly enough she has only worked three other YLs in all the contacts she has made and none of the three have been either VKs or ZLs. She works occasionally on phone, but prefers c.w., 95% of her contacts would be c.w., she said. She can copy 30 words a minute "on the mill" with comfort, but admits to being pretty flat out to send it at 25 words per minute.

She always enjoys a field day and she and Geoff go to Ruapehu each year for the ZL annual event.

She attends the radio meetings in her area and is the vice-president of her division. She was invited to accept nomination for president but declined.

She is a member of the A.R.E.C. (Amateur Radio Emergency Corps) which keeps her very busy. Emergency calls can come at any time of the night or day and necessitate constant vigilance on the band, but she finds this very interesting and absorbing and very worth while.

Well from all of the above you can gather what a very interesting person Peta was to talk with but just in case some of our XYLs with young families give up the ghost altogether after reading this, I'd like to mention that Peta hasn't got any family and, as she puts it, it does leave her more time to have other interests.

SUBSCRIPTIONS

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FIFTY-SIX MEGACYCLES AND ABOVE

ZK1BS in the Cook Islands is preparing for 5 metre operation. DX conditions on 56 Mc were in evidence early in December. VK2ATS heard VK3OF at R5 S8 and also worked VK7AB for an hour with S9 signals both ways. VK7AB runs 50w. to 35T final, 3 el. wide-spaced beam, and a cascode xtal converter; he did not hear any other station. VK3 stations should look out for Interstate stations as it is known that there are several now operating on 56 Mc.

The change over of crews on Macquarie Island took place early in December and the old crew has arrived back. Those just returned include Doug VK1IJ and Alec VK1DA, both sporting very handsome beards and looking very fit. The new crew includes VK0AA and VK0CJ who intend being active on 56 Mc. at their earliest opportunity. John VK0AA has taken with him gear for the 144 Mc. band and has ideas of putting up a 72 element beam. It will be interesting to hear how 72 elements will stand up to an Antarctic blizzard.

It will be remembered that VK1IJ, in the early part of 1956, heard two VK4 stations on 6 metres at very good strength. It is hoped that the new team will be able to carry on attempts to get through on v.h.f.

There are nine Amateurs with the new crew that left recently for the Antarctic Mainland to go to the Mawson Base at MacRobertsonland and the Vestfold Hills Base at Princess Elizabeth Land. They are VKs 0AB, 0AC, 0AS, 0DC, 0DJ, 0JP, 0PK, 0PR and 0ZM. They expect to be active early in the New Year and will be looking for contacts on 56 Mc.

On the evening of Thursday, 3rd January, excellent tropospheric conditions prevailed for 144 Mc. across to Tasmania when VK7PF and VK7BQ, of Launceston, worked many VK3 stations in the Gippsland and metropolitan areas.

The Ross Hull Memorial V.h.f. Contest concluded on 31st January last and logs should be forwarded to the Federal Contest Committee, Box 1234K, G.P.O., Adelaide, South Australia, to reach there not later than 1st March, 1957.

VICTORIA

The first V.h.f. Field Day for the summer season held recently was immensely successful. there was a large number of portables out on the various mountain tops, the weather was excellent, one of those really perfect sunny days and some very good contacts were made. Results will be published in next month's magazine. It has been decided to hold further V.h.f. Field Days on the third Sunday in the months of February, March and April, but with the reservation that when the date of the National Field Day is announced, the V.h.f. Field Day date will be arranged to coincide with that date in whichever month the National Field Day is to be held.

There was a good turn-up at the final fox hunt for 1956. We were pleased to see a couple of our old ones, Graeme 3ZAA and Norm 3ZBU, also a new starter Jacques 3ZEE who is one of our recent new members of the Institute. Most of the usual ones were there and Bob 3OJ again acted as control station. The first hiding spot the fox (3LN) chose was in some high grass just off the Boulevard in Hawthorn. Here the fox was endeavouring, with the aid of some 200 yards of co-ax and his three harmonics, to remove the antenna to a point somewhat distant from the tx, but 3VZ with that wizzard of a second op. he has, Jim Shaw, came along and caught him before he was properly organised. The second hiding place was among the stacks of timber down at the wharf. Here 3KD and Ray Price were the only ones to catch the fox, but he himself had a lot of fun chasing some of the other hounds round in circles in and out of the timber stacks. The third hiding place was a really tough one in the region of the Military Camp at Royal Park. Only one hound managed to scale the cliff on foot and when he reached the peak he was barely able to gasp out his call sign in order to claim his points for the catch. The call sign that came hesitantly over the warm night air was 3-A-O-G huh-huh-huh. The last hiding spot was in a serve at Maribyrnong. The first to ferret him out was again 3AOG, who was the winner for the evening, second was 3ADU and third was 3VZ. The final location was held at the home of Len ELN at Ascot Vale.

At the December V.h.f. meeting the Group was entertained with two interesting talks on v.h.f. equipment. The first one was by Peter 3ZAF who demonstrated his 1 mx tx and rx. He was assisted by Jacques 3ZEE who made a mobile tour of the city with the tx operating both from stationary and mobile positions while the Group back at the rooms listened with great interest to the transmissions coming over the rx. The results were very good with excellent copy all the way. Peter then described in detail his equipment and answered many questions put to him by the members. David 3ZAQ then followed Peter with another short lecture on his mobile equipment for 1 mx also. David is getting very excellent results from his equipment also and has had a contact of 67 miles with it on the occasion of a V.h.f. Field Day last season. There were three visitors welcomed to the meeting, they were Les ex-2ZBJ who will be at Ballarat for the next seven months, and Bob Lowe and Norm 3ANT.

Some good 2 mx contacts have been made recently, 3NN at Yannac was worked by 3ALZ and 3RK with signals over S9. 3ATN has been coming into Melbourne with S9 plus signals and Ballarat and Gippsland stations are also putting good signals into Melbourne. 5ZAM was heard by 3RK and 3ALZ. Don't forget that Thursday night is hook-up night with the Western District.

Of interest to v.h.f. listeners will be the news that there is now a relay of the 3WI Sunday morning broadcast of news for Amateurs in the 1 mx band on 292.5 Mc. This relay is being operated by David 3ZAQ in East Malvern. David is using a horizontally polarised antenna beaming in a north westerly direction.

Trevor 3ATR at Warracknabeal has got his new rig working nicely on 2 mx and is looking for Melbourne contacts. He is using 100w. input. Stan 3ZEB, a past student of the W.I.A.'s, A.O.C.P. course and who got his ticket last year, has now built up some gear for 2 mx and has it working nicely. His frequency is 144.144 Mc.—Phyl Moncur.

SOUTH AUSTRALIA

Advice from Mount Gambier indicates some increased activity from there, where Col 5CJ is working on his tx and by now should be using the frequency. Leo 5ZAG, whilst not over-active, plugs away and at the morse too, so won't be long. Tom 5TW not active at the moment, but hopes to resume on 2 any time now. Dan—a newcomer to the ranks—is giving the limited a go soon, so yet another 2 mx type coming up.

Report from Ceduna from the "Hexpedition" character said that on 30th Dec. 122 Mc was open from there to Tailem Bend—super refraction it is claimed—so it has fired George 5EC and 5AV to interest in v.h.f. and they reckon to get a signal on 2 using a.s.b.—xtal filter type of exciter. More of this when more known of it, but feel sure a lot will be interested in this for if reports of conditions from Ceduna are consistent and with a.s.b., a new interest will be aroused.

George 5GB is doing an extra broadcast of W.I.A. session on 1 mx Sunday nights these days from earlier recording, it is hoped soon to add a 2 mx extra from here soon on the same basis. The idea is to help those who cannot otherwise hear the news in the 10 a.m. session.

Mobile 2 mx interest is being revived by a newcomer to that activity in Bill 5ZAX who has carried out preliminary tests with Reg 5QR, mobile to Freeling and pretty good at that. Bill therefore adds to those with mobile gear others being 5GL, 5HG, 5MT and 5KC.

Had the pleasure of a visit to Bill recently to see both his mobile gear and the general set up, met Keith 5MT and Col 5RO there and they will agree with me that Bill's show has to be seen to be believed. The mobile gear set-up in a utility uses an SCR522 for tx with an AR8 and xtal converter for rx. The power supply for both are from genemotors with one on 6v. and the other on 24v. Yes 24v. The latter being looked after by a huge 24v. battery with appropriate generator fixed to the engine, all of this is through a central control panel which still leaves room for the driver and passenger. The antenna is a halo fed with co-ax through a balun. A mighty set-up and will be the subject of many further experiments of interest.

The main fixed gear there consists of an amazing assembly of apparatus mostly "home brew," but with once again that fine engineer's finish we all seek. Two steel racks flank an operating table the centre of which has the rx's and auxiliary gear and a sloping panel in the foreground contains the control switches, pilot lights and push buttons. In this assembly is to be found a Bendix MN26C, a sig. gen. 100 Kc. to 80 Mc., another 120-300 Mc., a 5 inch c.r.o., audio osc., wavemeters, beam indicators, BC-348 rx, Eddystone 640 rx, a 50 Mc. rx in course of conversion to 56, a standby 522 rx, and finally a 522 tx mounted in a beautiful rack complete with power supply and modulator.

The antenna tower, 70 feet high, is topped with (or soon will be) a 2 mx ground plane, a 3 el. on 2 mx (to be replaced by a 12 el. co-linear on 2 soon), and a G4ZU. An adjournment to the workshop to see the mobile rig made eyes further pop out, when it was learned push button controls were affixed to the garage doors, soon to be completed by radio control! Then a highlight, junior op. turned up with a radio controlled model bus that "guess who" gave "who" for Christmas. He put it on the floor and made it do its tricks—that settled it, for we all dived on to it and started to dissect it to find out what made it tick. Congrats on your whole set-up, Bill.—6EF.

TRANSISTORS IN AUDIO AMPLIFIERS

Although in principle a large number of circuits can be obtained by combining grounded emitter, grounded base or grounded collector configurations with transformer or R-C coupling, in practice transistor audio amplifiers tend to follow a simple pattern. A typical circuit can be considered to have grounded emitter stages in cascade, with R-C coupling, and with d.c. stabilisation provided by the potential divider and emitter resistor method.

The maximum power gain available with perfect matching (and transformer coupling) when the effective load resistance in the collector circuit $R_L = \sqrt{r'_{22} \cdot r'_{out}}$ and the effective source resistance $R_s = \sqrt{r'_{11} \cdot r'_{in}}$ is

$$\left(\frac{\alpha'}{\sqrt{r'_{11}} + \sqrt{r'_{in}}}\right)^2 \cdot r'_{22}.$$

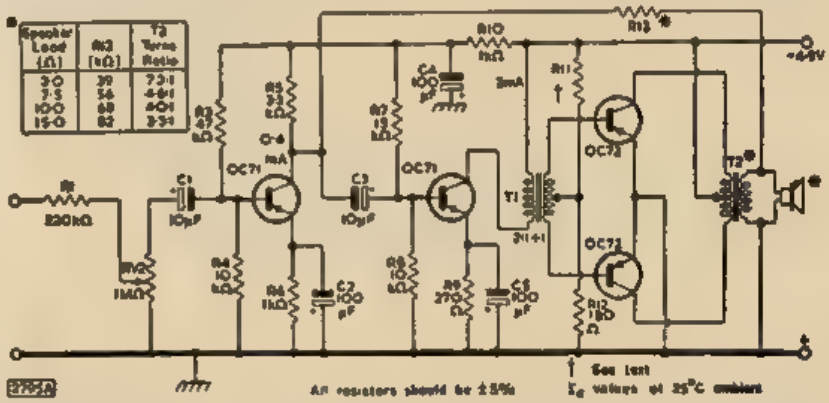
R-C coupling is preferred generally to transformer coupling for low cost and phase shift and good response, but the power gain of each stage then arises solely from the inherently high current gain of the grounded emitter stage, and the higher gain which would be available by impedance matching with the transformer is not achieved.

The factors entering into the design of an R-C coupled transistor cascade are not difficult to appreciate; many of them are similar to those encountered when working with valves. The collector voltage and current are limited by d.c. ratings $V_c$max and $I_c$max, and by a.c. ratings $v_{c(pk)}$max and $i_{c(pk)}$max. For high gain and output power the battery voltage should be high, but a lower voltage and hence smaller current drain is more economical. The high value of collector load resistance required for maximum gain cannot be obtained with R-C coupling, as there is no advantage in making the collector load very much greater than the effective parallel input impedance of the next stage. In addition, the load resistance and collector current determine the voltage available across the transistor, which is also reduced by the emitter resistance included for stabilising. The collector current should therefore be small so that a large collector load resistance can be used; on the other hand a large collector current swamps the variation in collector leakage current $I_{c(o)}$ with temperature.

After allowing for these various conflicting claims, the number of stages is chosen to give the required overall gain when feedback is applied. Since the signal swing in the early stages is small, the d.c. working point can be chosen for low current drain (and noise), provided they have potential divider and emitter resistor d.c. stabilisation. The power gain in the grounded emitter R-C coupled stage can be calculated from $(\alpha')^2 R_L / r'_{in}$, the a.c. current gain being α' and the voltage gain $\alpha' R_L / r'_{in}$. This expression assumes that R_L is very much smaller than r'_{22} and r'_{out}.

Here, α', r'_{in}, etc. are Small-Signal parameters given in published data and computed for the working point employed. As the load on an R-C coupled stage is formed by its collector resistance in parallel with the input resistance of the following stage, the power and voltage gain for each stage can be calculated by working backwards through the cascade.

Class AB push-pull operation in which the bias corresponds very nearly to that for true Class B operation is a natural choice for the output stage when a transistor amplifier is to be designed as a power amplifier, that is, to give the highest output power permitted by the collector dissipation p_{cmax}, without objectionable distortion. The quiescent power consumption is very small and the efficiency is high. The Mullard OC72 is intended for this mode of operation. An actual circuit is shown in the diagram, the output power being 200mW for 10% total harmonic distortion for an input of about 6mV at C1 or 500mV at R1. Negative feedback is applied over the driver and output stages by R13, which is matched to the loudspeaker. A small amount of bias is provided to the OC72's by the potential divider R11-R12, which is effective in reducing the high crossover distortion inherent in a true Class B transistor output stage.



The value of R11 must be chosen from the range 6.8, 6.2, 5.6, 5.1, 4.7, and 4.3kΩ so as to adjust the total quiescent current in the output stage to 1.3mA ± 10% at 20°C or 1.6mA ± 10% at 25°C. The operating ranges with speech and music are 15°C to 45°C ambient temperature and 4.5V to 2.7V (or even 2.0V, depending on the distortion tolerated by the listener).

MULLARD ALL-TRANSISTOR AMPLIFIER – TRANSFORMER DETAILS

Interstage Transformer
"C" core, 0.004 in. strip, English Electric HWR/4/5/5.
Window length and breadth = 11/16 in. x 5/16 in.
Strip width = 5/16 in.; Build-up = 5/16 in.
Length of flux path = 2.93 in., Net area = 0.09 in.²
Primary: 2000 turns of 38 s.w.g. enamelled copper wire. D.C. resistance = 144 ohms.
Secondary: 2 x 1000 turns of 38 s.w.g. enamelled copper wire.
D.C. resistance = 50 ohms + 75 ohms.
Shunt inductance = 10H with primary current of 3mA d.c.

Output Transformer
"C" core, 0·004 in. strip, English Electric HWR/30/8/5.
Window length & breadth = 2 in. x ½ in.
Strip width = ½ in.; Build-up = ½ in.
Length of flux path = 6.34 in.; Net Area = 0.178 in.²
Primary: 2 x 360 turns of 23 s.w.g. enamelled copper wire.
D.C. resistance = 1.45 ohms + 1.45 ohms.
Secondary (for 10 ohms load): 180 turns of 20 s.w.g. enamelled copper wire.
D.C. resistance = 0.57 ohms. Shunt inductance > 0.5H.

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FEDERAL, QSL, and DIVISIONAL NOTES

FEDERAL

CHANGE OF FEDERAL TRAFFIC OFFICER

After some years of exemplary effort as Federal Traffic Officer, Doug Paine (VK3FH) has found it necessary to resign from the position.

The splendid manner in which the traffic net maintained its schedules and the high standard of message handling can be attributed to the enthusiasm of VK3FH.

For the present Gordon Weynton (VK3XU) will be controlling the net, but it is expected that Reg Jepson (VK3JI) will be taking over at the end of the month. With these experienced "brass pounders" at the Federal end the net will run as smoothly as ever.

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FEDERAL QSL BUREAU

The R.A.F. Amateur Radio Club on Labuan Island, Br. North Borneo, desire to make known the fact that they are in operational existence on 14 Mc. c.w. and seek VK contacts. Several R.A.A.F. men serving on the Island are club members; their C.O. has the call ZC5VN and is active. Two R.A.F. members, ZC5GL and ZC5JM, are also active on 14 Mc. c.w. and their QSLs have been sighted. The members appear to use individual call signs when operating the club's 60w. tx. Rx is a HRO. Operating times are during the evening local time.

Many cards dating back to 1948 have been returned from Pakistan. The only endorsement thereon is "returned." The bulk of the cards are for AP4A and AP8TM.

The Richmond Amateur Radio Club (Virginia, U.S.A.) announces the availability of an attractive certificate to be known as VA-JF. It is being offered in connection with the 1957 Jamestown festival. The year long festival is expected to attract many tourists and the many splendid new buildings with their exhibitions will be open for years to come. The festival is scheduled to open during April, 1957, at Jamestown, Virginia, to commemorate the 350th anniversary of the first permanent English settlement in America in 1607. The requirements for this award are the submission of cards proving 25 (twenty-five) two-way contacts with different stations in Virginia during the period Jan 1, 1957, to December 31, 1957. C.w., phone, or a combination of both are acceptable and stickers for additional 25 contacts at a time, up to 125, will be issued. Claims for the award, accompanied by the QSLs, are to be sent to Richmond Amateur Radio Club, Box 1985, Richmond 15, Virginia, U.S.A. QSLs and certificate will be returned to the claimants. No mention is made of any I.R.C. being necessary.

—Ray Jones, VK3RJ, Federal QSL Manager.

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NEW SOUTH WALES

By the time you read these notes, history will have been made in the New South Wales Division. Thanks to the generous donations of over 200 of our members and the "hard labour" and unstinted efforts of helpers too numerous to mention, the building of the home for VK2WI will be complete. This modern brick structure, situated in an ideal, elevated location, overlooking most of the city, and commanding views to the famous Blue Mountains to the west, is a fitting memorial to the efforts of all past workers for this Division, and something of which we can all feel proud. One of our earliest objectives has been achieved. Let us not lose sight of the fact that we have another project—club rooms and a central meeting place for members. Many ideas and a lot of effort have gone into this too. May we see this dream also come true in the not-to-far distant future.

Another Divisional Hamfest has come and gone and a full report will appear in the next issue of "A.R."

At the December meeting there was a good roll-up to hear talks by Robbie 2US, Dave 2LJ and Greg 2ANP. This trio, equipped with slides and samples of gear from other parts of the world, kept the meeting well entertained. Much interest was shown in a G6S mobile receiver which Dave brought back from the States—hope you managed to take it home again, Dave. The meeting concluded with coffee and biscuits to a general background of Christmas greetings.

HUNTER BRANCH

Thirteen members and two visitors attended the December meeting of the Branch at the University of Technology, Tighes Hill. The visitors were Ken 2PY and Dick Retallick, son of that old stager, Crieff 2XO.

Due to the fact that the University was in recess and equipment was having its annual overhaul, no projector could be obtained to show the films which had been procured for the meeting. An auction of surplus gear brought along by members was held, Ken 2PY being conscripted as auctioneer. The lack of bids and small sales made were no reflection, however, on Ken's ability as a auctioneer. The meeting concluded with a rag chew and enabled John 2XQ to show members a transistorised rx of pocket size, but ample audio, which he had brought along.

Ron 2ASJ hasn't been on much of late but did follow the Sydney-Hobart Yacht Race on the yacht frequency; Ron also reports receiving cards from the trip to Anna Bay in 1953. Peter Alexander, formerly VK2PA, well known to Hunter Branch members, is now in VR land with the call sign VR2DA. Joe 2ANL has been bitten with the bug again but will be mostly active on 10 mx. Frank 2AUH and Varley 2SF heard QSOing across town at 3 a.m. in the morning; they probably suffer from insomnia. Bob 2AQR, from "Westy," active on 40 mx.

There was no January meeting, the next meeting of the Hunter Branch will be held on Friday, 8th February, at the usual location.

UPPER HUNTER GROUP

Well chaps here we are in the New Year 1957 and regret to say that this is the first time I have really been stumped for news of your activity. For a New Year Resolution suggest that you all help make the monthly news interesting, for your scribe cannot write about nothing. Can only guess that the festive season has taken its toll, hi! A note of interest is that ZL3CU reports that t.v. channel 2 is being regularly received in ZL and t.v. receivers are being constructed. The two metre band really became unstuck for the V.h.f. Group's Xmas Scramble—five stations being worked by 2ANU, 10 stations being heard in all. No news from Geoff 2VU for nearly two months now, what is it Geoff, t.v.? Nev 2OS busy helping the local broadcast station move to new premises. Nothing heard of Tas 2GV or Les 2ZCB. Well chaps these notes depend on you, so please help out with some news.—2ANU.

COALFIELDS AND LAKES

Geoff 2VU of Singleton and Ken 2ANU, of Muswellbrook are two of the Hunter Valley's regulars, mostly using v.h.f. bands. From Geoff I understand they are receiving Sydney t.v. at Singleton under some conditions. Nev 2OS, while busy at Muswellbrook b.c. station, would not take much talking to become active again. I don't hear the Woy Woy boys much here, but Major 2RU of Gosford is fairly regular on most bands. From Wyong way Doug 2ASA is only one heard. Bob 2KF of Kurri Kurri is only one active from that area; how's the W8JK beam going? Was talking to Jack 2KQ in person at Toronto; he is active, but time limited. 2AHT, also at Toronto, is DXing and has a good location with a really good antenna set up, those masts 70 odd feet high are quite imposing. 2YL only active station at present from Cessnock and working most bands.

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VICTORIA

Congratulations to the following: Firstly to David 3ADW, Federal Councillor and Victorian Divisional Councillor, and his XYL Judy on the birth of their first harmonic, a son. Secondly to Alan Elliott (ex-3ZBE) on having passed the required morse code test for the full licence; Alan's new call sign is 3AEL. And thirdly to George Robertson on having passed the theory examinations. George got his c.w. about 12 months ago, c.w. was never any trouble to him, 30 words a minute is just a nice comfortable speed to George. His call sign is 3WJ and he hopes to be on the air shortly. George was a previous student of the Institute's A.O.C.P. classes and also, during his time as an Associate member of the Institute has been a very active working member. He has been fulfilling the job of membership secretary for some time past.

Of interest to Amateurs in VK and transmitter hunters in particular will be the following extracts from a letter received from Ian 3ZAM, who is at present spending two years in England doing an electronics course. I quote:

"I had a lot of fun when I joined a tx hunt party, the hunt was on 160 mx (a band not available in VK). We hid the tx gear in a dip in a bank of a small creek, over which grew a hedge. We set up the antenna along the hedge and retired to our hollow pulling some grass over the gear. Although located 10 miles from the starting point, it was only an hour after our first transmission that two figures dashed across the sky-line on the other side of the hedge and creek; however, we kept quiet and they went past. Two or three minutes later a couple of other cars came racing along our side and just about stood on us. Shortly after, the first two came back looking more closely and eventually spotted us and so the others came along too, five parties in all, within one and a half hours of our going on the air. When transmitting as G3ATZ, I found I landed to give VK instead of G unless I concentrated on what I was saying."

The next round of the Bi-Monthly All Band Scramble will be held on Monday, 4th February, between the hours of 2000 to 2200 E.A.S.T. An attractive certificate will be awarded to the winner of each section. For full details re rules, etc., refer to copy of "A.R." for Sept., 1955, page 12.

The next general meeting of the VK3 Division will be held on Wednesday, February 6, at 8 p.m. at the Radio School of the Royal Melbourne Technical College. The programme will include a short picture programme to be followed by a general discussion on W.I.A. policy, etc. The March 6 general meeting will take the form of a tour of inspection of the radio and television section of the Royal Melbourne Technical College with the possibility of a t.v. lecture also.

SOUTH WESTERN ZONE

Well now that we are over the festive period let's hope the zone wakes up and becomes a little more active because it certainly hasn't been too good lately. Neil 3HG comes on at 10 a.m. each Sunday morning for the hook-up but finishes up talking to himself, so what about it chaps, there must be plenty who can come on and make it worth while. Fred 3ALG, John 3ARJ and Bill 3BU have been on the last couple of Sundays but no one else. How about letting us know what date the Convention is, as it is in Geelong about March or April? 3AEH was heard on through Xmas working portable from Gippsland, a good signal in Warrnambool, Ted. 3AGD not heard much these days but I happened to see XJ530, a station waggon, parked near the foreshore of Warrnambool, have you forgotten where we live, John? Bert 7III, who used to be in our zone as 3BI in Ballarat, wishes all his old zone mates every best wish for 1957. Better get the filament transformer replaced Bert, very nice signal here in Warrnambool, 8-9 plus.

3BU has been receiving the t.v. very well, so I hear. Harry 3XT is still busy finishing off the caravan, hence the silence from this end. We now have another new chap in Warrnambool, Gordon 3AGE (from Colac), well we wish you every happiness to be back in your old home town and what about a little r.f. on Sunday mornings on the hook-ups at 10 a.m. on 7080 Kc.

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QUEENSLAND

We haven't much to report this month except that the Brisbane boys are settling down again after the festive season and are eagerly awaiting the peak of conditions, expected in February or March. The bands have been going crazy lately and we have been hearing stuff we haven't heard for years. Now and again there are blackouts and nothing is heard of good DX for days and then it's back, better than before.

There is no doubt about these "true blue" DX men; recently a report appeared in the press that the R.A.F. was going to re-build an airfield in the Maldive Islands, 500 miles from Ceylon, as an alternative to airfields the R.A.F. was going to lose in Ceylon. A few of the keen DX men in Brisbane developed palpitations of the heart and severe cases of drooling at the thought of a potential ham in that rare country.

A point of interest to the boys still requiring zone 23 for the W.A.Z. certificate. There is a station active in Tannu Tuva on 15 metres who is in zone 23 and does QSL.

Council would like to say "congrats." to the successful candidates in the last published results of A.O.C.P. and L.A.O.C.P., especially

the four chaps who were associates when they sat for it. Welcome to the ranks of full members and congratulations, Cress Everdell, Ron Grandison, Graham Pooley and Cliff Jenkins. The next examination should coincide with the closing stages of Stan Armstrong's No. 1 course and we hope that the boys who sit will all "make the grade."

After the recent visit to VK of W6AL we are now expecting a visit from W7QFY, Bill Bentson, of Portland, Oregon, whose XYL is out here in Brisbane visiting her folks. Bill is still in the U.S. Army and is coming here by a round about route. He has 90 days' leave and will fly on Military aircraft by way of Hawaii, Wake Island, Guam, the Philippines, Singapore, Darwin and finally Brisbane. He will be on a U.S. Air Force "kite" to Manilla, on an R.A.F. one to Singapore, and R.A.A.F. from there to Brisbane. Pity he can't operate "airborne mobile." He will possibly be in Brisbane for a general meeting so the boys will be able to meet him.

Talking about going overseas, a small note in the sideband section of a recent "QST" said: "Ramsay, VK4AB, will be visiting the U.S. early in 1957." Half your luck, Ramsay, wish we were going with you.

We have been informed by the Junior Chamber of Commerce that the special QSLs for the Hobbies Show in the City Hall basement in November and December last year are almost ready. So all the stations which contacted VK4WI and listeners who sent in reports will soon be getting one of these special cards. They will be something special and will be a good advertisement for the Brisbane J.C's. especially in the overseas countries we contacted. Peter Evans, the President of the Brisbane branch of the J.C., said that if the Ham exhibit didn't touch a spark off inside some potential delinquents, it did interest quite a few of the members of the Junior Chamber in Ham Radio especially when they heard that there are a few J.C. nets in the States. They are interested in getting a club station and you wont have much trouble in guessing what call sign they would like—the only trouble is whether or not it's available. They want us to put on an exhibit at the next Hobby Show which will be in the main auditorium of the City Hall.

Council has tried to line up some good lectures for general meetings for 1957 and we may have some surprises for you. So don't slip up on meetings through the year.

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SOUTH AUSTRALIA

The December get-together of the Division took the usual Christmas form and was a fine example of fellowship. There were between 80 to 90 present, including a lot of "old timers" who turned up to meet the younger members, all of which helped to make it a jolly evening where seriousness was laid aside and a good time had by all. The old timers were busy telling about those that "got away," whilst the newer members and particularly the associates who are attending the classes this year were thinking about those they will work.

The President wasn't allowed to conduct the formal side with any degree of continuity for some die-hards anticipated his every announcement and in quick succession—minutes taken as read—business be suspended—and the like, had the agenda quickly disposed to the past tense. The confirmation of new members (1 full and 9 associates), agenda items for forthcoming conference, emergency fire service proposals being the only items to run the full course.

QSL cards were distributed after some films were shown and then the tables were set up and the food put on show and to use—the quantity there made it necessary to get down to serious eating quickly and even then there was a lot to spare. The dispensing of "coke" was done by Jim 5FO in such a persuasive method that after a while everyone was afraid to even look in his direction for fear another would be thrust upon one. Hot drinks were handed out by Doc 5MD, Warwick 5PS and Jim Parish who with towels over arms made very attentive and attractive waitresses.

The usual rowdy element were seen (and heard), namely Athol 5LQ, Joe 5JO, Les 5AX, Lionel 5LB, Jack 5LN, whilst in another corner the quieter more sedate types like Luke 5LL were in evidence. All in all another jolly fine event that concluded by 11.45 p.m. with the more domestic council members and helpers "washing up."

One face not present was Jim 5JK, who unfortunately was in hospital; hope you are out and about now Jim and that your spell there had the desired effect.

For you more advanced types who may be contemplating the erection of beams and towers please take the advice of a contributor to "QST" who advises consulting the Bible, Luke 14 : 28. Carl 5SS is continuing his slow morse on Wednesdays 2000-2100 hours and Sundays 1930-2030 hours on 288 Mc. This is a great benefit to the many studying at present—thanks Carl, the boys appreciate your work. Austin 5WO heard recently bashing W land on 10 and getting f.b. reports; heard a queue form up one morning to answer his CQ. Jack 5LR heard testing a new unit with 6146 final and on temporary modulator (10 watts) and was doing a good job, nice to hear you on the d.c. bands Jack, keep up the good work.

The Blackwood gang, Jack 5LR, Reg 5RR and Chas 5ON, must have a good location for they each speak of juicy DX as well as being able to put out splendid signals into city and near country areas. Chas' long wire out was followed by the term b.c.i.—for shame.

NORTH WESTERN

Wal 5DF advises the re-building of his tx has reached the drawing board stage (flash, don't you think?) and is to be part. 807s 100w. c.w., 70w. phone, until the modulator is re-built. Alf Mack (associate) is helping Wal (full member) to brush up his morse!! Pat 5LT chasing rare DX on 20 and was so hot on trail of some that the 807s p.p. final got red hot and fused all the elements, and is now digging into boxes (his) to locate another pair. Geo. 5GA should soon be back on the air. Brian 5CA paid Lincoln a visit and contacted Wal at the "salt mine," but didn't get to the shack, due to hurried departure—what chased you, Brian?

Gordon 5XU has been getting about (yes, he is in N.W. section this time), being portable up amongst our dark ancestors hunting grounds beyond Ceduna on the famous "Hexpedition." He has had a good number of contacts using the portable gear on 7 Mc., which created much local interest. Conditions being that from 9 to 11 a.m., 7 Mc. was wide open to Adelaide at good strength and then again after 6 p.m. Ceduna is apparently a very fine place for reception where Gordon heard people who he had never worked from home QTH.

SOUTH EAST

Sorry about last month chaps, but your notes arrived late. John 5JA has made a name for himself by taking an interest in t.v. and picking up programmes from Melbourne at Mt. Gambier, then to add fuel to the fire there are other t.v. rx's operating down there so that Rob 5RG's visit to the meeting and talk on t.v.i. was most opertune. Both these one-eyed monsters are near Col 5CJ, and they are not owned by either Claude 5CH or Leo 5ZAG who have been "accused" of owning same as disclosed by their 144 Mc. beams. Such fame. Stewart has not been over active for quite a while, business reasons, but is back on the air again—if less frequently—and heard working DX. Erg 5KU similarly not over active, but will make up lee-way after the holiday fever leaves him.

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WESTERN AUSTRALIA

At the Divisional meeting held on Dec. 18 there was a good attendance of city and country members and visitors included Messrs. Grey and Trigwell, from the Radio Branch. Mr. Bert Grey held the original 6BO call, now held by Rolo Everingham, who was present. Other infrequent visitors noticed were 6CP and 6TX. Apologies were received from Mr. Gregg, 6RC and 6FT. We hope Fred will soon be fit again.

A message was read from 4DD (ex-4DD), of D.C.A. expressing Xmas and New Year Greetings. The President presented the trophy to Tom 6TH, of Brunswick Junction, and complimented him on being the first country member to win the 40 Mx Scramble. A new member, Ralph Hallimore, was elected. The meeting concluded with the playing back of a tape which was sent over from South Africa by three ex-VK6 members now resident there, viz., Neville Dawson ZS6AND (ex-VK6ND), Len Redding ZS6LR (ex-VK6LR), and Jack Squires ZS6ADR (ex-VK6JS). The tape held greeting messages from the three, and also from the Radio Superintendent at Johannesburg to Amateurs in VK6, and recordings of the following stations heard in ZS over the air—VKs 6FL, 6MK, 6LL, 6LU and 6BS.

Congratulations to Dave 6WT on coming top in t.v. classes for the second successive year. Also to Tom Long, of Bunbury, 6ZAL, who has passed the A.O.C.P. for a full call. We understand 6FD and 6JG helped him with morse practice in true ham tradition.

W1APF, who recently did a round of VK6 ham shacks, has been worked on 20 mx lately and was putting in a good signal. Recent visitors to VK6 were ZE2KQ, VK5HN and XYL, and VK4PN. We trust they had a happy time over here. Also W6MTQ. 6VK is putting out an f.b. s.s.b. signal now. 6AG and 6EJ have re-built their modulators with good results. 6LA, Port Hedland, and 6DG, of Troughton Island, can be heard on 20 mx from the northern parts of W.A.—the latter also works 15 mx and is the most northerly Amateur active in VK6, and is very isolated, only getting one or two mails per year.

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TASMANIA

NORTH WESTERN ZONE

The New Year will be well under way by the time these notes are printed, and thoughts of Christmas and New Year festivities will be a memory, although we hope that any resolutions made for 1957 will still be brand new, and that much projects as re-building the old rig, helping the XYL in the house, erecting that new beam tower, assisting the XYL in the garden, etc., are being pushed forward with a great surge of will-power. Stick to it, chaps! Onward and upward!

Although we on the N.W. are not exactly in the centre of t.v. primary service area, or even on the fringe, remarkable results are being reported in the zone, although, of course, pictures and sound are intermittent. Sid 7SF has been receiving sound on the 186 Mc. band, an improvement was noted in signal strength when a new 6 element yagi was erected, in place of a 4 element of lighter construction.

Our President, Jim 7JO, has also been having success on the 186 Mc. band. Jim was greatly intrigued by the "Horse Opera" showing one night. You'll have to pay licence soon Jim, if the signals are too consistent.

Associate Max Ives is into battle with his A.O.C.P. course and also has a band switched rx on the way. Roy 7RN conspicuous still by his absent signal. I'm not sure if Roy is chasing fish or gazing intently at his new modulation checker as he assembles his new rig piece by piece. Let's hear something, Roy.

Have very little news of the associates this month, but as the year gets under way, hope to get around again and contact them personally. Don't forget the Field Day, on the first Sunday in February, chaps. Jim tells me he has a good spot picked out for us.

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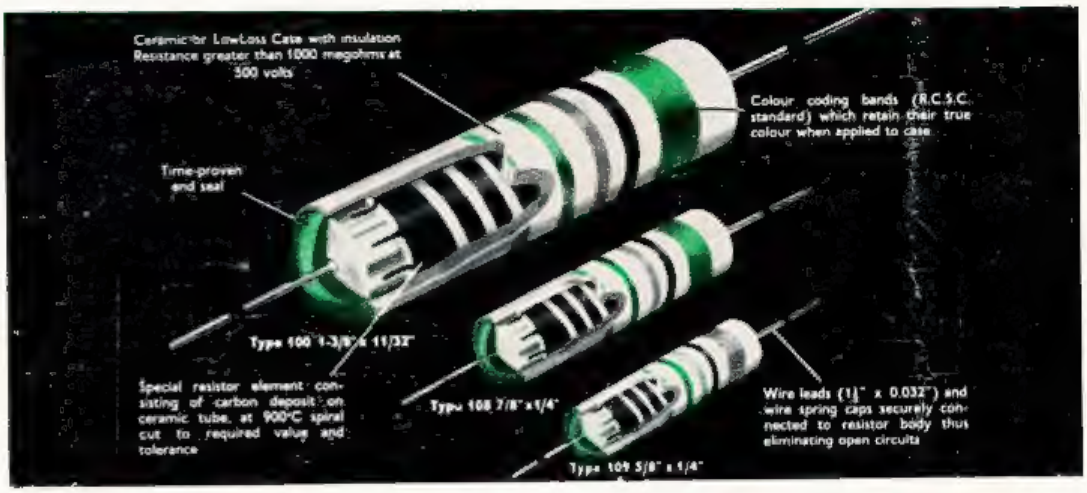

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COLOUR CODE

In the standardised system of colour coding the colours are read from the end of the resistor adjacent to the colour bands. The third colour always indicates the number of "noughts" following the first two numerals. The colour code is as follows:—

Black	**0**	**Green**	**5**
Brown	**1**	**Blue**	**6**
Red	**2**	**Violet**	**7**
Orange	**3**	**Grey**	**8**
Yellow	**4**	**White**	**9**

If a fourth band is added on resistors, it indicates the tolerance according to the following code:—

Gold, ± 5% tolerance;
Silver, ± 10% tolerance.

If the fourth metallic indication is absent, the tolerance is assumed to be 20%.

Examples:

1. Red, Violet, Orange, Silver—27,000 ohms ± 10%.
2. Yellow, Violet, Black, Gold—47 ohms ± 5%.
3. Blue, Grey, Brown—680 ohms ± 20%.

INTERNATIONAL PREFERRED VALUES (10% Tolerance)

The following table lists the standard resistor values in ohms, comprising the 10% Tolerance Range. Each resistor covers values within ± 10% of its nominal value.

Pref. V.	Res. Range	Pref. Val.	Res. Range	Pref. Value	Res. Range	Pref. Value	Res. Range
10	10- 11	330	297- 363	10,000	9,000- 11,000	330,000	297,000-363,000
12	11- 13	390	351- 429	12,000	10,800- 13,200	390,000	351,000-429,000
15	14- 16	470	423- 517	15,000	13,500- 16,500	470,000	423,000-517,000
18	17- 19	560	504- 616	18,000	16,200- 19,800	560,000	504,000-616,000
22	20- 24	680	612- 748	22,000	19,800- 24,200	680,000	612,000-748,000
27	25- 30	820	738- 902	27,000	24,300- 29,700	820,000	738,000-902,000
33	30- 36	1,000	900-1,100	33,000	29,700- 36,300	1.0 meg.	0.9 -1.1 meg.
39	36- 42	1,200	1,080-1,320	39,000	35,100- 42,900	1.2 meg.	1.08-1.32 meg.
47	43- 51	1,500	1,350-1,650	47,000	42,300- 51,700	1.5 meg.	1.35-1.65 meg.
56	52- 61	1,800	1,620-1,980	56,000	50,400- 61,600	1.8 meg.	1.62-1.98 meg.
68	62- 74	2,200	1,980-2,420	68,000	61,200- 74,800	2.2 meg.	1.98-2.42 meg.
82	74- 90	2,700	2,430-2,970	82,000	73,800- 90,200	2.7 meg.	2.43-2.97 meg.
100	90-110	3,300	2,970-3,630	100,000	90,000-110,000	3.3 meg.	2.97-3.63 meg.
120	108-132	3,900	3,510-4,290	120,000	108,000-132,000	3.9 meg.	3.51-4.29 meg.
150	135-165	4,700	4,230-5,170	150,000	135,000-165,000	4.7 meg.	4.23-5.17 meg.
180	162-198	5,600	5,040-6,160	180,000	162,000-198,000	5.6 meg.	5.04-6.16 meg.
220	198-242	6,800	6,120-7,480	220,000	198,000-242,000	6.8 meg.	6.12-7.48 meg.
270	243-297	8,200	7,380-9,020	270,000	243,000-297,000	8.2 meg.	7.38-9.02 meg.

INTERNATIONAL PREFERRED VALUES (20% Tolerance)

Pref. V.	Res. Range	Pref. Val.	Res. Range	Pref. Value	Res. Range	Pref. Value	Res. Range
10	10- 12	330	264- 396	10,000	8,000- 12,000	470,000	376,000-564,000
15	12- 18	470	376- 564	15,000	12,000- 18,000	680,000	544,000-816,000
22	18- 26	680	544- 820	22,000	17,600- 26,400	1.0 meg.	0.80-1.20 meg.
33	27- 39	1,000	800-1,200	33,000	26,400- 39,600	1.5 meg.	1.20-1.80 meg.
47	38- 56	1,500	1,200-1,800	47,000	37,600- 56,400	2.2 meg.	1.76-2.64 meg.
68	55- 81	2,200	1,760-2,640	68,000	54,400- 81,600	3.3 meg.	2.64-3.96 meg.
100	80-120	3,300	2,640-3,960	100,000	80,000-120,000	4.7 meg.	3.76-5.64 meg.
150	120-180	4,700	3,760-5,640	150,000	120,000-180,000	6.8 meg.	5.44-8.16 meg.
220	178-264	6,800	5,440-8,160	220,000	176,000-264,000	10.0 meg.	8.00-10.0 meg.
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